LA-UR-16-27298
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Title: The Los Alamos Scientific Laboratory - An Isolated Nuclear Research Establishment

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Intended for: Internal Distribution

Issued: 2016-09-23

THE LOS ALAMOS SCIENTIFIC LABORATORY – AN ISOLATED NUCLEAR RESEARCH ESTABLISHMENT

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Editor's Note

Early in his twenty-five year career as the Director of the Los Alamos Scientific Laboratory, Norris Bradbury wrote at length about the atomic bomb and the many implications the bomb might have on the world. His themes were both technical and philosophical. In 1963, after nearly twenty years of leading the nation's first nuclear weapons laboratory, Bradbury took the opportunity to broaden his writing. In a paper delivered to the International Atomic Energy Agency's symposium on the "Criteria in the Selection of Sites for the Construction of Reactors and Nuclear Research Centers," Bradbury took the opportunity to talk about the business of nuclear research and the human component of operating a scientific laboratory. Below is the transcript of his talk.

The Los Alamos Scientific Laboratory was established in 1943 and is thus one of the oldest, if not the oldest, of the isolated nuclear research laboratories in the world. Many of the criteria leading to the selection of its particular location were involved in the particular problems associated with its responsibility in connection with the development of a nuclear weapon. Nevertheless the general matters considered in the adoption of the site, the problems which have arisen in Laboratory administration and operation, and the techniques which have been employed for their solution appear to be as relevant to the problems of nuclear research laboratories today as they were at the start of the nuclear age, more than twenty years ago.

In order to provide a background and framework for this discussion, it may be desirable to provide a brief description of the Los Alamos Scientific Laboratory as it exists today as well as an understanding of its administrative situation within the United States Atomic Energy Commission and of its general current technical responsibilities. The Laboratory, of course, is an agency of that Commission and is operated for it by the University of California under a non-profit, actual cost, reimbursable contract that has now been in effect for more than twenty years. The Laboratory is located in a mountainous and forested area in northern New Mexico, in the southwestern part of the United States. Contrary to what may be the general impression concerning this part of the world, the specific area is one of scenic beauty and climatological attractiveness. The scientific, technical, and administrative staff of the Laboratory, exclusive of purely construction, guard, and maintenance forces, is approximately 3500 people. The associated community has some 14,000 residents of whom over 5000, somewhat surprisingly, are children. The nearest city, Santa Fe, New Mexico, and capital of the State, is approximately 35 miles away by paved road. There are no railroad or other commercial transportation links and all transportation in and out of the area is by air or by motor vehicle.

[1] 1909-1997

The annual budget for the Laboratory is of the order of $100,000,000 and the approximate value of its technical facilities and structures is about $150,000,000. The approximate cost of the associated community is about $135,000,000 exclusive of any land value.

Although the Los Alamos Scientific Laboratory was concerned initially primarily with the nuclear research, development, and engineering directly related to nuclear weapons, its present responsibilities have greatly broadened and expanded, and at the present time the classified areas of its activities, including the problems of specific weapon development, are now a rather small fraction of its total work. Fundamentally, the Laboratory has two closely related types of activity. The first of these is to conduct exploratory research in those areas of nuclear physics, nuclear chemistry, nuclear metallurgy, hydrodynamics and explosive phenomenology, plasma physics, mathematics, and techniques of mathematical computation which are required for, related to, or peripheral to its general areas of responsibility for various programmatic accomplishments. In addition to its weapon responsibilities, the Laboratory has a major responsibility for the development of a basic design for the use of nuclear power for space rocket propulsion (the ROVER program); the development of a very high temperature (2000^0 F) cheaply refueled, unclad fuel element, gas cooled (helium) reactor (the UHTREX program)[2]; the development of plutonium, and specifically molten plutonium, to avoid fuel element reprocessing costs by continuous fuel repurification, as a reactor fuel looking eventually towards the inevitable necessity of breeder reactor construction (the LAMPRE program); two important programs in plasma physics: one the long range study of the properties of plasmas which might eventually result in the practical production of power from the fusion process (the SHERWOOD program), and the other an attempt through the use of plasma thermocouple devices operating at very high temperatures with fissionable materials to go directly from fission energy to electrical power. Initiated in the beginning as a research program in radiation biology and the toxicology of fissionable and other exotic or radioactive materials, the Laboratory also conducts an extensive program in radiation biophysics, particularly in the area of long-term low-level chronic irradiation effects. The biological research program is now rapidly expanding into the newer areas of cellular and molecular biology, making interesting use of the varied technical and mathematical facilities of the Laboratory.

The technical facilities of the Laboratory include a 15 MeV variable energy cyclotron, an 8 MeV vertical Van de Graaff accelerator, which is presently being extended to over 22 MeV through the addition of tandem type accelerators, several smaller Van de Graaff and Cockcroft-Walton type accelerators, two small purely research type reactors for nuclear physics experiments, a 20 mev, high current, microsecond pulse type generator, and so on. There are, of course, extensive laboratory facilities for the handling and fabrication of plutonium and for the conduct of physical, chemical, and metallurgical research on this and other uranic and transuranic materials. Equally extensive facilities exist for all varieties of “hot” radiochemistry and other research activities on radioactive materials including numerous hot cells with remote handling equipment. Research in the shock and hydrodynamic properties of materials is

[2] Ultra High Temperature Reactor Experiment.

supported by high-speed photographic equipment, as well as extensive facilities of explosive research, development, and fabrication. Supporting computational facilities include an IBM STRETCH computer, several 7090 IBM computers and a locally designed and constructed MANIAC computer. The obviously essential libraries, machine shops, electronic and instrument shops exist in proportion.

With this background, one may now turn to the more specific problems of siting and operating new nuclear research laboratories in the light of the Los Alamos experience. Before, however, considering these matters in more detail, there are three general comments with respect to any laboratory, which it is extremely import to bear in mind at all times. These points are obvious upon even the most casual reflection; but they are frequently forgotten. The first of these points is that a laboratory must exist for a purpose. There must be specific, objective, and tangible reasons for it to exist, and there must be tangible and realistic goals – including (possibly even the entire program) the general pursuit of scientific knowledge – which is reasonable for achievement. Too frequently, one may guess, a laboratory is put into existence because of some vague belief that "Science is a good thing," or "Everyone else has a laboratory, why shouldn't we?" without any clear picture of where such an institution really fits into governmental, economic, or national goals. The raison d'etre of a scientific research laboratory may come from either or both of two sources: The governmental branch or the sponsoring institution, which will supply it funds and the individual who undertakes its technical direction. The laboratory will inevitably mirror to a considerable extent the beliefs, philosophies, and objectives of its director; indeed, very frequently and very properly, the eloquence of the presentation of his views and the extent to which he is determined to achieve them have a profound effect upon the views of the institution or agency from which his laboratory derives its support. Calamity is almost inevitable when the basic philosophies and goals of the director and the agency he represents differ!

Secondly, associated with this matter of *definitiveness* of purpose for a laboratory is the *uniqueness* of that purpose. It has been our experience at Los Alamos that the sense of almost personal responsibility for this country's objectives, which a scientist feels, is enormously greater when the responsibility of the laboratory towards these objectives is not shared or diluted with other agencies or with absentee technical direction. I do not believe that this sense of dedication and responsibility can be underestimated; I also believe that it is fairly easy to lose by setting up parallel laboratories without clearly separated areas of specific responsibility, or by taking away from the laboratory the responsibility for detailed technical decisions and keeping it in the hands of distant governmental administrators.

Thirdly, any human institution, but most particularly a scientific institution, is the construction of the people in it. Without good scientists, a scientific research laboratory is a nonentity no matter how good the mechanical or technical facilities. Therefore, almost every policy or administrative question must first be viewed in the light: How will a decision one way or another seem to the caliber of scientific personnel the laboratory must attract, retain, and whose scientific productivity it must maximize. The problem is a formidable one – to many career administrators an impossible and an insane one – but nevertheless usually understandable and resolvable in the light of the fact that the scientist is a human being – occasional opinions to the contrary notwithstanding!

Let us now turn to some of the purely technical requirements, which had to be faced in the siting of the Los Alamos Scientific Laboratory. In the early days of atomic energy, the problems of the accidental release of nuclear energy and radioactivity were only qualitatively understood, but they were understood sufficiently clearly to encourage no one to permit the establishment of a laboratory dealing with considerable amounts of fissionable or radioactive material and particularly its assembly into potentially critical conditions anywhere very close to ordinary normal urban environments. Even today, in spite of the remarkable record of public safety of all atomic energy work, it seems unlikely that anyone would seriously consider the location of such a laboratory in other than a rural or other relatively remote location with respect to other non-directly involved human beings. This was certainly the case with Los Alamos in New Mexico in the United States and where there were essentially no residents within a radius of thirty miles, and no real city for 35 miles.

Meteorological, climatological, and even physical features of the terrain are of importance. In the case of Los Alamos, it could be foreseen that a great number of experiments, particularly those involving explosives and related hydrodynamic phenomena would have to be done out of doors and widely separated from buildings and from each other. The physical features of the terrain with alternating plateaus (called "mesas" from the Spanish word for table), separated by deep canyons, were ideal for such physical separation. In at least one instance canyon walls provided excellent nuclear shielding for a reactor experiment. To do technical work out of doors requires that, on the average, the weather be reasonably moderate without long seasons of extreme heat, cold, or precipitation. The inevitable electronic and photographic instrumentation suggests that the experimenter's work will be enormously easier if the humidity is reasonably low. Fortunately many of these latter characteristics are precisely those that will seem attractive to a people as a place to live!

Inevitably, modern (and even early!) nuclear research establishments involve reactors, possibly their radioactive effluents, and radioactive materials. Exhaust gases from any source carrying a toxic or radioactive burden must clearly be emitted at such heights, in such directions, and at such distances that no possibility of harm can be foreseen to neighboring communities or populations. This clearly requires studies of both the ordinary and the micrometeorology of any proposed location if radioactivity in significant amounts is capable of dispersal. As examples of the manner in which these considerations have been applied at Los Alamos, one may note that our major plutonium facility (from which no radioactivity can emerge except under conditions of fire or explosion) is located in an area across which the wind can essentially never blow towards permanent residential quarters. Similarly the stack which carries off that small fraction of the fission product gases from our small 25 kW homogeneous "water boiler reactor" which escape trapping is about a mile from the community proper as well as 150 feet above the terrain. It may be noted that this latter situation, which has never led to any condition even approaching minimum tolerance, nevertheless is regarded by us as potentially borderline under some meteorological conditions, and studies are under way to reduce still further even this minimal situation.

We have found at Los Alamos that our electric power requirements continually increase both with the size of the Laboratory and the diversification of the technical program. Our own figures would probably be precisely relevant nowhere else, but we have observed that our average power demand per employee is now approximately 4 kW with a peak load of about twice this, and that demand has doubled in the last ten years. Water for cooling and other Laboratory purposes has always been a mild problem here since the easily available surface water is in small supply and the area in general is short of this important utility. Its availability must normally be considered in connection with the power demand, since if it is necessary to cool large laboratory equipment by refrigeration, evaporative cooling, or other closed loop cycles, as opposed to other open loop methods, the power problem is correspondingly increased. Parenthetically, it may be noted that the power and water demand of an associated community must be kept in mind. In the case of Los Alamos, the annual consumption of water by the community of 14,000 persons is approximately 700 million gallons, and the Laboratory uses 400 million gallons. The community uses approximately 15-20 million kWh per year.

From what has been said so far, it might appear that isolation is a primary factor to be sought in the location of a nuclear research laboratory. This, of course, is far from the case, and the matter might better be stated as "No more isolation than can possibly be avoided on technical grounds!" Some isolation is probably inevitable, but the objective must also be to minimize it. From a technical point of view, access to highways, railroads, and air transportation is important. From a human point of view, reasonable and occasional access to some form of urban life is of the greatest help – if not to the scientist, then to his wife! Even the most enlightened construction and management of a community associated directly with a research laboratory still carries with it some of the aspects of a "company town" and the inevitable restriction of afterhours social contacts to those with whom one is likely to be professionally associated during day can become both tedious and irritating. With particular reference, again, to Los Alamos, we have been fortunate in the proximity of Santa Fe, the capital of the State of New Mexico. It is a small city of about 40,000, but one of the oldest cities in the Southwest and one of great historic and artistic charm. It has museums and galleries, a wide variety of shops and services, and being within an hour's distance from Los Alamos, provides a most welcome occasional change from our own community. It may be noted as an incidental and curious fact of Los Alamos that it has *no* railroad connection and that every item of technical and daily life and for construction has been brought there by truck over a road which ascends more than 2000 feet above its crossing of the Rio Grande River. It is also of curious interest that there exists no form of commercial public transportation to or from Los Alamos other than a small private airline which operates several times a day between there and Albuquerque, New Mexico (a road distance of perhaps 100 miles or 30 minutes flying time) which carries more than 2,000 passengers per month on both official and private business. As you may guess, the private automobile is the common form of personal transportation.

Proximity to universities or other academic institutions is frequently cited as an important requirement in the location of a nuclear research laboratory. This criterion, while evidently desirable, is probably overestimated in importance. Practical considerations of geography probably make it impossible for such a laboratory to be close in the sense of easy daily commuting to more than one institution in any event. Other considerations of siting make it likely to be at a distance beyond immediate day-to-day contact with any such institution. It is not believed that this apparent difficulty should be taken too seriously. It turns out to be a practical fact that university scientists and professors, with families and children, rather strongly prefer to remain fairly close to their classrooms, their own research laboratories, and homes. When they do undertake to move about, they generally do so for periods of the order of six months or a year. In this case, the actual distance between the research laboratory and any university is obviously of no great consequence. In any event, the facilities of modern transportation make it possible for periodic visits of a consultative nature, lasting a few days to perhaps a few weeks, to take place under almost any reasonable set of geographic conditions.

Turning now to the question of general laboratory administration and the particularly difficult matter of personnel policies for scientific people, one is led into a bewildering array of opinions, which generally agree in the broad and qualitative terms and disagree in almost every specific detail. In these remarks, it is proposed to touch on only those techniques of scientific administration which seem to have been effective at Los Alamos and to avoid any assertion that they will necessarily work everywhere or at all times.

Probably the most profound difference between the Atomic Energy Commission and other governmental agencies in the United States responsible for the operation of scientific research laboratories is the extent to which the former agency has utilized industrial or academic contractors to carry out the actual day-to-day operation of its technical establishments. This is in direct contrast with the more usual procedures, found probably in most other countries as well, in which the laboratory supported by government funds has the employees therein in the direct pay of the government or agency thereof. Initiated as a policy by the Manhattan Engineer District in 1941, which, as a cover agency operated by the United States Army during World War II, carried out the initial nuclear development in the United States, the Atomic Energy Commission has continued the policy ever since of carrying out all its technical operations by appropriate technical contractors. Believing, and probably correctly, that the most common home of most productive and most forward-looking research was in the University and carried out by its professional staff and graduate students, the Manhattan Engineer District, and thereafter the Atomic Energy Commission, requested great universities to undertake non-profit, full reimbursement contracts for the administration and detailed technical direction of their scientific research laboratories. The Commission reserved only the obvious right to establish the general fiscal level of effort and the most general area, scope, and determination of the research and programmatic efforts. The determination of the necessary facilities was initiated by the chosen contractor, approved by the Commission, and constructed by the government. Thereafter the contractor operated them with his own and new personnel acquired for the effort but utilizing the administrative and personnel procedures customary in the academic field.

In my opinion, this procedure, although relatively unique, has been outstandingly successful. With every respect to the excellence and dedication of most government servants and most directly operated government laboratories, nevertheless all governments seem to acquire inevitably some patina of bureaucracy, of forms, rules, and regulations. Admirable, protective, and safe, as many of these formalities are, they nevertheless are frequently ill adapted to the pace of philosophy of modern scientific research or to the individuals who accomplish it. I, therefore, urge, although it may be a purely personal point of view, that the possibility of utilizing this administrative technique be thoroughly explored whenever the operation of a new laboratory is under consideration.

The size and organization of a scientific research laboratory is a favorite topic for discussion but the results are never conclusive. There appear to be no "best" size, and the best organization is almost inevitably a matter of the best utilization of the people, with their own quirks of personality, special abilities, and possible weaknesses. It is certainly possible that a laboratory can be too large, but at what point this occurs is impossible to state. At some point a laboratory, becoming too large, will be seen to be merely a collection of smaller laboratories increasingly isolated from one other – but this point may occur when the laboratory has 500 people or more than 5000, depending on its task and the competence of its direction. It may be of more importance to note that a laboratory can be *too small* – it is convenient to use the analogy of a critical mass. Below some point, with too little equipment, too little technical assistance, too few senior people, the necessary stimulus by individual cross-fertilization and by actual technical accomplishment does not occur. No precise rules, of course, can be given other than the perfectly obvious statement that it is extremely important that the task, the area of research, the extent of the program not be beyond the bounds for which money and people can be found. Nothing is more dreary to a scientist than to have ideas - and to fail to have the facilities to accomplish them!

The internal policies appropriate to a research laboratory are easy to discuss in broad generalities and usually very difficult to put in precise quantitative or objective terms. It is proposed to deal here with only a fraction of the obvious areas of concern and omit some of the most troublesome such as the perennial question of the relationship between professional and scientific freedom and the so-called "direction" of research other than to note that the individual who attempts to "direct" research must either be exceptionally qualified in many fields and much more qualified than anyone he is directing, or he would do better to replace the word "direct" with words such as "stimulate," "encourage," "guide," or even "make possible!"

Scientists, being human beings, have no simple set of motivations. Besides difficult and varied responses to the question of the manner in which the scientific professional hierarchy is set up about them, how it exerts either "authority" or "guidance" (*i.e.*, how the inevitable question of "freedom for scientific research" is handled), the excitement or uniqueness of the facilities, technical libraries, and computational aids, areas of research, and national objectives of the laboratory, there remains simple questions having to do with salary scales, contact with other scientific colleagues, and contact with the educational world to mention a few of the more important.

At Los Alamos, we do not use fixed salaries or fixed salary ranges for scientific personnel, but rather a system in which each individual is, as best as we can, compared with his professional colleagues within the Laboratory. The general Laboratory scientific salary scale itself is determined from a survey of professional scientific salaries across the United States covering some 43,000 individuals on the basis essentially of age (or years since professional degree) versus salary. This has a practical result that a scientist at Los Alamos is paid, on the average, what his professional colleagues across the United States are paid and, individually, as best we can determine his internal relative merit and standing. The pragmatic test of such a system can only be applied by examining the percentage of employment offers, which are accepted and rejected, and by a comparison with what may be regarded as normal scientific laboratory turnover rate. This latter figure for the Los Alamos Scientific Laboratory has averaged about 6% per year over the last decade.

An isolated research laboratory must be particularly careful to insure that its scientific staff does not feel scientifically isolated. Two major ways exist and have been used at Los Alamos to bring this about: To encourage the attendance of members of the scientific staff at scientific meetings in the area of their specialty at least once a year and oftener if the status of the individual or the character of his research results warrants. Since some areas of research may be classified and still others may be in programmatic areas not immediately relevant to publication in scientific journals, no requirement is made that attendance at scientific meetings be dependent upon the presentation of a technical paper. It may be argued that it is even more important for such individuals to be able to mingle with and feel a part of their own scientific society when they are *not* in an immediate position to publish scientific results. Needless to say, there is also a purely selfish and administrative interest of the laboratory, from the point of view of contact with other personnel and their possible recruitment, in having its personnel attend scientific meetings. All of this is in no way intended to minimize the possibility that someone may actually *learn* something as well!

A second technique, which has been used at Los Alamos with great scientific as well as personnel profit, is to encourage the visit to the Laboratory by a variety of technical consultants from both universities and industry. The travel cost and other expenses of such individuals are paid as well as an appropriate fee per day. They come for periods of a few days to even a few months during the summer season at which times their families frequently accompany them. The result of such visits is both technically advantageous and gives the local staff a real sense of being in direct contact with what may be called the outside scientific world. It should be born in mind that travel costs and consultant costs, while sometimes tempting for governmental administrators to criticize or worry about are actually a very small proportion of the total operating budget of a laboratory. At Los Alamos, officials scientific and consultant costs of this sort comprise only *½%* of our total budget.

The need for contact with the educational world is less easy to define and varies more widely with the individual. The desire to teach, the desire to have contact with a changing group comparable to the usual graduate student or postgraduate Fellow in a university is widespread but not universal. Among the younger members of the scientific staff, particularly those without the Doctor's degree there is a common desire to continue their educational career. The periodic sabbatical year feature of ordinary academic life is frequently a very valuable concomitant of scientific life. At Los Alamos we do, in one way or another, all of these things: A graduate student summer employment program brings of the order of one hundred graduate students to the Laboratory for three months from universities and colleges around the country. There is a Graduate Center operated for us by the University of New Mexico at which evening courses are given in a wide variety of scientific subjects taught partially by members of our own staff and partially by members of the faculty of the University of New Mexico. These courses can and do lead to advanced degrees. We have a program for the doing of graduate theses by students from universities again across the country that come to us as employees but do undertake a specific program of research leading to a thesis, which will ultimately be accepted, by their parent university. In these cases, the home university naturally takes all the responsibility for the fulfillment of other academic requirements and the Los Alamos responsibility is confined to providing the facilities for and guidance in the conduct of the thesis investigation under some member or members of our own staff. From another area, we invite and encourage members of academic staffs to spend their sabbatical leaves here. On our part, we have a sabbatical leave privilege which permits individuals, under conditions almost exactly parallel to those in a university, to take periodic and paid leave from the Laboratory to engage in academic or other relevant teaching or research activity.

If one now leaves the Laboratory and follows the staff member to his home, one finds a totally new aspect of his life and thinking. We have discovered over and over again at Los Alamos when we interview prospective employees that they ask four questions in about the following order:

What would be my scientific work?
What kind of quarters will my family and I live in?
What kind of schools are there for my children?
What kind of medical facilities are there?

Even salary questions seem to follow after these! Fortunate is the laboratory, which can answer the last three questions well, and unlucky is the one that cannot! When it is necessary to build a community adjacent to an isolated laboratory, all too frequently one is faced with one of the most shortsighted areas in government administration – specifically that having to do with the character of housing which a government will build for its personnel. No matter how tempting the technical facilities, how urgent the national interest in the technical problem, the average scientist is unlikely to accept, for long, housing that is inferior to that which he can have in comparable academic or industrial professional employment. Nor will he tolerate inferior schools for his children or substandard medical care for himself and his family. At Los Alamos we have been extremely fortunate in all of these respects. Nevertheless, the single, greatest factor in the termination of our scientific staff is dissatisfaction with housing. Normally, one must hasten to add, it is the scientist's *wife* who is unhappy, but it is the scientist that one eventually loses! The most familiar and saddest response we hear is "I like everything about my job, but my wife doesn't like our house; I am going to have to leave!" One can only urge: Do it well! Do it as well as one possible can! If the burden can be shifted to an adjacent community, the immediate problem may seem to be lessened but the real problem remains. Scientists these days are in intense demand; they command good salaries; they are not likely long to be content with poor living conditions in an isolated laboratory, no matter how well equipped and financed, than they can command elsewhere in their country.

As an interesting side light on the characters and personalities of people, the usual worries about adequate community recreational facilities seem of secondary importance. At Los Alamos we have been pleased, even amazed, by the extent to which a community of this sort develops its own recreational and cultural outlets. The scientist is likely to be as versatile outside the laboratory as he usually is in it. Here again, at Los Alamos, we have been extraordinarily fortunate, both in our location, in our people, and in the administrative policies of the Atomic Energy Commission.

From all that has been said, however, it would be quite erroneous to conclude that Los Alamos has solved all of the problems of an isolated laboratory for nuclear research! As only one example, we have not solved the problem of what may be called the aging of the Laboratory staff. Ten years ago the average age of a member of our scientific staff was 34.5 years; now it is 39 years. Clearly this is a simple result of a fairly slow growth rate, and a relatively low turnover of staff. Since our mandatory retirement age is, in common with the University of California, 65 or 67 years, it is clear that the end of this process has not yet been reached. Short-term appointments, emphasis on the hiring of younger persons as replacements or additions, overall growth in Laboratory size are all only partially feasible counter-measures and only partially effective. Involuntary early retirement or termination would be a solution occurring only to the most isolated administrator and hopelessly impossible in practice. The problem is not unique to Los Alamos; it started after the war almost everywhere as new scientific laboratories were started with new and young people. Every laboratory of which I am aware is experiencing this condition of its scientific staff, unless it is growing at an enormous rate. Perhaps it is not a problem at all; it only arise as a worry out of some faint evidence that the years of greatest productivity of a scientist are often found between 25 and 40. But this was in other times and in other conditions, and not necessarily relevant to an era of great laboratories with great staffs and great supporting facilities. With no solution to propose – at least seriously – one must perforce only remain conscious of the situation and observe it.

With respect to the community, we have had a continuing problem and we may be exchanging it for a new one. For almost twenty years, all land and every house in Los Alamos has been owned by the United States Government. Thus every employee, every scientist, every resident of necessity rented his home, and private home ownership was nearly impossible with the nearest land available for purchase some 15 to 30 miles away. This has led to a variety of problems in a country where the renting or personal ownership of a home in normally a matter of personal choice with common tradition leading to the latter decision eventually. Retirement, death of the employee, termination for one reason or another always required that the occupant vacate his home in which he may have lived for two decades. The house was never his to modify or decorate as he pleased. Even the house available to him was dictated by rules based on salary, length of service, and size of family and thus almost independent of his personal choice or individual income. Los Alamos is essentially the last of the government-owned communities in the United States, the communities and homes at Oak Ridge, Tennessee, and at Hanford, Washington, having been sold to their occupants some years ago. It has now been decided to transfer by direct sale the homes at Los Alamos to ownership by their occupants. This change will not be complete for at least five years and is certain to bring new problems, particularly fiscal ones in the area of community services such as schools, utilities, and street maintenance. It will be challenging to see how it works and what new difficulties arise and how they are solved!