

**New Mexico's Faustian Bargain with Science:
Balancing Pride, Greed and Fear
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On July 16, 1945, for the first time in history, an atomic bomb exploded in the New Mexican desert at a site baptized Trinity by the father of the atomic bomb, J. Robert Oppenheimer. The explosion was the culmination of the Manhattan Project, a two-billion dollar enterprise funded by the United States in collaboration with the United Kingdom and Canada. The project had its origins in a letter from Albert Einstein who, in 1939, wrote to F. D. Roosevelt to warn the American president of the Germans' progress in the race to unleash a new unprecedented destructive force: the atom. This letter initiated atomic research in the U.S. and marked the beginning of a secret armament race with the Germans. Named after the location headquarters of the Manhattan Engineering District in New York, the atomic project connected facilities in several states but the final and paramount phase occurred on the Pajarito Plateau in northern New Mexico.¹ On November 16, 1943, American physicist J. Robert Oppenheimer made a suggestion to his military counterpart, General Leslie Groves, that the Los Alamos Ranch School would be an adequate location for the establishment of a secret laboratory to work on the design and construction of the bomb. With this move, the "Land of Enchantment" acquired a new identity as the cradle of the nuclear age.

Over the following years, what was at first a hurriedly-built scientific community on top of an isolated *mesa* not only grew to become the Los Alamos National Laboratories (LANL) but also had a momentous impact on the surrounding area: the laboratory was catalytic to a vast movement of scientific colonization and soon produced extensions and partners all along the Rio Grande river.² The current socio-economic, demographic, and environmental situation of New Mexico is a direct result of the history of the Manhattan Project. But its heritage is not just statistics and great scientific advancements: It is also an emotional legacy at the heart of

¹ The laboratory later known as Oak Ridge was installed in Knoxville, Tennessee to carry out the isotopic enrichment of uranium through electromagnetic separation and gas and thermal diffusion: it was center X. Production of plutonium was first ensured by the Metallurgical laboratory at the University of Chicago headed by Arthur H. Compton but because the required quantity of plutonium soon asked for greater and more powerful reactors, center W that would later become the Hanford Laboratory was built on the Columbia River in Washington. The Los Alamos Laboratories, center Y, was meant to centralize the research that had been conducted so far in university laboratories throughout the country.

² A *mesa* is a mountain that has a flat top and steep sides.

conflicts, frustrations and fears. Interviews with local residents who participated in the birth of the laboratories reveal the complex emotional stages they went through as the truth of nuclear weaponry and its derivatives unfolded itself.³ The socio-economic and environmental consequences of the nuclear economy caused the distress and confusion of its humblest actors because a veil of secrecy initially condemned them to ignorance of the long-term consequences of the project. How can one evaluate the sustainability and fairness of the benefits entailed by a new booming industry – jobs, federal monies, attractiveness for the state, inflow of tourists etc. – when these benefits also bring anxiety about radioactivity? The risks of nuclear power plants and nuclear waste matters are now public knowledge; therefore, environmental and health concerns have taken the place of the Cold War fears of nuclear warfare. How did this high-technology revolution and the dilemmas posed by its belatedly-disclosed outcomes affect the New Mexican population who heavily relied, and still relies, on this source of employment? The new sentiments of anger and resentment, generated by revelations about the dangers people were exposed to, counterbalanced the pride and greed produced by the arrival of nuclear science in the area. That is why I consider the expression "a Faustian bargain" appropriate to define New Mexico's relation with science. In return for nuclear jobs, the price paid by New Mexicans was not solely environmental. The advent of the nuclear industry also exacerbated socio-economic inequalities and increased the state's dependence on federal government support and industry demands. My purpose here is to shed light differently on a part of New Mexican history that has often been dealt with from an outside perspective – of politicians, military men, and scientists – but too rarely from the point of view of the more obscure people whose lives were shattered by their encounter with science.⁴ Locals have contributed to the success of the labs, to the profits made by the uranium industry, to the construction and maintenance of storage sites, to American military supremacy, and to the advancement of

³ My research is based on the personal conversations I have had with New Mexico residents during fieldwork undertaken in 2012 and 2013, on the *Impact Los Alamos* project of the University of New Mexico (quoted as UNM in the text) as part of the Oral History Projects and Video Recordings Collection at the UNM Center for Southwest Research which resulted in a special issue of the *New Mexico Historical Review* entitled "Impact Los Alamos," on the *Los Alamos Revisited* project, another collection of interviews directed by Peter Malmgren at the New Mexico State Records Center and Archives in Santa Fe, and on local newspaper and magazine articles.

⁴ For representative voices of outside perspectives, see the collective work edited by Lawrence Badash, Joseph Hirschfelder, and Herbert P. Broida, *Reminiscences of Los Alamos, 1943-1945* which assembles scientists' and other Manhattan Project participants' essays on their work and memories at Los Alamos. Cynthia Kelly's work *The Manhattan Project: The Birth of the Atomic Bomb in the Words of Its Creators, Eyewitnesses, and Historians* also provides testimonials of actors who came to New Mexico with the Manhattan Project.

science. Based on the testimonies of former LANL workers and other local actors in interviews and newspapers, and on the historical facts which demonstrate New Mexico's transformation, this paper examines the emotional responses of native New Mexicans to their industrial Faustian bargain.

This sentimental retelling of the scientific conquest of New Mexico will first focus on the definition of a scientific revolution which I also call the third conquest of New Mexico.⁵ I will contrast the picture of pre-WW II New Mexico with that of present-day New Mexico and underscore the immediate emotional impact that these changes had on New Mexican populations. A second part centers on the identity crisis which resulted from this regional metamorphosis, showing how the socio-economic disruptions entailed by the scientific conquest bestowed a radically new face on the state and widened the gap between traditions and modernity. Finally, part three consists of a study of how nuclear energy and New Mexican lives have intersected in more recent years, emphasizing the price that New Mexico has had and will have to pay for its Faustian bargain with science.

I. A scientific revolution

In the winter of 1942-1943, science and technology entered the secluded world of northern New Mexico; they successfully settled and then gradually spread to the surrounding region in the postwar decades, joining the "Land of Enchantment" and nuclear science in an indelible bond. The reputation of the state became linked to the history of nuclear science, its economy integrated the nuclear and high-tech industries to the point of becoming dependent on them, and New Mexicans found themselves bonded by a Faustian bargain with a new powerful employment source. Historian Ferenc Szasz wrote of this bond: "Ever since 1945, the world has linked 'atomic' with New Mexico [...]. And perhaps therein lies the ultimate legacy of the Second World War on the Land of Enchantment" ("Second World War" 307). The impact of the arrival of atomic science in the course of the Second World War can indeed be defined as a "legacy" or a "heritage" but it can also be termed a revolution because, clearly, the events of 1942-1943 led this pastoral, isolated, mostly ignored land on the path towards becoming a high-technology, federally-sponsored Eldorado. The extent of the emotional impact of New Mexico's transformation on its

⁵ The scientific conquest comes third after the Spanish and the American conquests.

population is also a reason why I consider the term "revolution" appropriate: the arrival of science *revolutionized* some of these people's lives in that it inaugurated a thorough break with traditional lifeways. The example of Paul Montoya illustrates to what lengths his life was altered by the arrival of the lab: Montoya was seven in 1942 when U.S. marshals asked his family to pack their things and leave their ranch on the Pajarito Plateau. His testimony is published in a newspaper article of 2003: "It was a blessing to get out of the work – no more hauling, no more chasing cattle [...] We thought of it as a blessing until we realized there was no more going back" (Rankin). Montoya and his brother later got jobs at LANL. He considered himself lucky for he had a good job that compensated for the fact that losing the land "always lived in his mind" (Rankin). But when he retired in 1993 after thirty-one years at LANL, he was diagnosed with beryllium sensitivity, a condition that weakened his immune system attributable to his work as a fabrication technician handling nuclear materials. His grandson, Gilbert Montoya recalled how "Every once in a while, he used to cry just like a baby, and I would say 'What are you crying for?' 'Oh, my ranch,' he said. That sort of emotion and connection to the land left its mark" (Rankin). The emotional legacy was even more formidable due to the rapidity and magnitude of the transition from reclusiveness and reliance on land to working for a mighty and secretive corporation in a cutting-edge technology.

On the eve of the war, residents outside the main urban centers of Albuquerque and Santa Fe lived in a secluded world organized in self-sustaining villages and pueblos, isolated ranches, and small mining towns. In many respects, the economy of the state was then still pre-capitalist, as land was the central measure of wealth and a major means of production. The family land would go from father to son and the transmission included the knowledge of how to work the land, how to water from the *acequias*, and how to live according to the rhythm of the seasons.⁶ This intimacy with the land was fully part of these rural communities' identity because farming was the main way to acquire food and, occasionally, small revenues but agriculture was also generally important for the whole state since it was its principal source of employment (McDonald 9). In villages, transactions and exchanges were more immediate because people rarely used cash: they bartered. Land was a source of sustenance and autonomy for families who farmed every corner they had, used the earth to

⁶ *Acequias* are irrigation ditches.

build their houses, gathered plants for culinary and medicinal purposes, hunted, and fished (Kay 55 ; DeBuys 196). As shown above by Paul Montoya's emotional reaction to the loss of his land, attachment to the land was genuinely strong not only for Hispanic farmers but also for the ranchers, sheep herders, homesteaders and Pueblo Indians who completely relied on their land for survival. New Mexican journalist and writer, Juan Estevan Arellano even considers *nuevomexicanos* as wholly part of the land; he writes about a "communion with the landscape": "Though once we, *la raza cósmica* (The Cosmic Race), might have been an alien presence in this land – because of our Spanish fathers – we have now become as natural in this landscape as the piñon tree" (32). Yet if a family did not own enough land to sustain itself or in times of great droughts like the one which hit New Mexico at the same time as the 1930s Great Depression, breadwinners and often other family members as well had to leave and find work elsewhere, sometimes as far as Colorado, Arizona, Montana, Wyoming, or California (UNM; Kay 65). The second non-qualified employment option within the state up to that point was in the mining industries.⁷ In that regard, New Mexico was completely part of the entity Gerald Nash calls "America's third world":

In 1940 the West was still characterized by a colonial economy. The region's primary emphasis was on the extraction of raw materials to be sent for processing to the older East, where the region also secured its manufactured goods. Agriculture, livestock, and mining were the major industries of this underdeveloped area that constituted America's 'Third World.' (*Reshaping 2*)

Being part of "America's third world" and one of the least populated states, New Mexico attracted few permanent immigrants. Isolation was both what protected ancestral lifestyles and prevented a modernization of the economy which could have provided more job opportunities. The state's main attractions prior to the birth of the labs were sightseeing, archeology and an exceptional climate that promised to cure certain life-threatening diseases. At the beginning of the twentieth century sanatoria and hospitals mushroomed all over the region offering climatological cures for tuberculosis and hot spring treatments. Oppenheimer himself first came to the state in 1921 to recover from dysentery and fell in love with the desert. He wrote in a letter to a friend that he dreamed to combine his two great loves: physics and the desert, which he did when he took Dudley and Groves to the Ranch School he had once ridden to on horseback while on vacation in the area (Bird 28, 205). Tourists and artists came to take advantage of what the state had to offer: its climate,

⁷ New Mexico's extractive industries have included coal, silver, gold, zinc, copper, potash, and oil.

its impressive sceneries, and the colorful exoticism of its native populations. The immediate cultural and economic impact of these visitors' presence on the Hispanic and Pueblo villages remained limited. In 1943 the region's isolation, ironically, became an asset.

Changes leading to the scientific revolution first started on the Pajarito Plateau, thirty-six miles northwest of Santa Fe, where Detroit-born businessman Ashley Pond had realized his dream: the Los Alamos Ranch School.⁸ Pond's students were eastern boys sent by their wealthy families to toughen up thanks to the outdoor activities built into the curriculum and the rough conditions of high-altitude life. For the Manhattan project, the national government needed roughly 54,000 acres. Most of it was taken from the national forest, but the rest, about 8,900 acres, were private lands belonging to the school, Anchor Ranch and local Hispanic homesteaders which the U.S. government condemned. On February 7, 1943, the Manhattan Engineering District took official possession of the Ranch School in "the interests of the United States in the prosecution of the War..." (Stimson) and scientists started moving in. In their narratives of the wartime years, many Hill dwellers, as Los Alamos' residents were typically called, made the analogy between their experience in northern New Mexico and tales of life on the Frontier.⁹ Ruth Marshak, a scientist's wife, expressed the typical sentiment when she wrote "I felt akin to the pioneer women accompanying their husbands across the uncharted plains westward, alert to danger, resigned to the fact that they journeyed, for weal or for woe, into the Unknown" (2). While previous visitors of the region – artists, health-seekers, and tourists – were attracted by the prospects of a life away from the unhealthy industrial cities of the East, scientists and their families were ordered to go northern New Mexico. In their accounts, the pioneer scientists' perceptions of their experiences are heavily influenced by "Wild West" and Manifest Destiny myths because of how little they knew about the area before arriving there. These early

⁸ The school was founded the spring of 1917 and flourished under the directorship of Albert J. Connell, a former Forest Service ranger and scoutmaster in the Jemez Forest Reserve. The school also called itself the "outdoor school" and was designated under the category of "fresh air schools". In 1937 the institution had 44 twelve-to-eighteen-year-old students who participated in various activities inspired by Progressive-era concerns about health and education: arts and crafts, community work, hunting and fishing, cooking, sports, riding trips to Pueblo ruins, and weekend pack trips. They slept on a screened porch at the Big House, wore shorts year-round, and were each assigned a horse to care after. The pedagogies of the school were meant to appeal to wealthy parents who increasingly considered hygiene and physical education as important components of a successful upbringing.

⁹ Figures such as the Indian fighter Kit Carson who lived in Taos or the outlaw Billy the Kid who was buried at Fort Sumner and the advertisements of the local tourist industry helped maintain the association of New Mexico with the westward expansion of the U.S. See "Alluring New Mexico: Engineered Enchantment, 1880-1941" by Marta Weigle in *Telling New Mexico: A New History*, 233-246.

pioneers' mindsets and images of the West as the frontier of civilization conditioned the way they interacted with the non-English-speaking locals who were hired at Los Alamos: they were predisposed to consider them with inquisitiveness and paternalism.

The exceptional circumstances of war deprived many families of the livelihood provided by the land they owned on the plateau and had to give up to the government for derisory compensations. They built new homes in the valley, hoping their land would be returned to them eventually as promised, but meanwhile they sought jobs from the newcomers. The project hired profusely: construction workers, janitors, cooks and maids from the valley but also from the nearby Indian pueblos of San Ildefonso, Cochiti or Santa Clara. The encounter between individuals from the scientific and surrounding autochthonous communities aroused a curiosity on both sides which was favorable to exchanges but the role differences between natives and settlers also fueled stereotypical representations. In terms of social status, local workers were considered inferior to Project scientists. Combined with the preconceptions some scientists cultivated about them, their social and economic inferiority made them prone to caricature. Charlie Masters, a teacher at Los Alamos, recalled a farcical theater scene played by Otto Frisch at the British Mission party: Frisch played the part of an Indian maid wrapped in a rug. After the house wife gave her instructions, Frisch as the maid moved very slowly and pretended to "work" cleaning dishes on the window curtains. After a few moments, he went to the fridge to empty a bottle of alcohol as the maid's "reward." This is just one example of the simplistic images that some Los Alamos dwellers fostered and were not hesitant to circulate of their local servants (Masters 122). Such stereotypes, caricatures, and simplistic images constitute the cultural legacy of the conquest of the West (Limerick) and were instrumentalized by the local tourist industry. Thus from the start a relational pattern between Los Alamosians and local New Mexicans emerged which produced sentiments of inferiority toward LANL staff members on the part of local residents who, many years later, have eventually found ways - and interlocutors - to express their emotions (UNM).

In 1944, Manhattan Project officials turned to other locations in the region when it became clear that more remote, extensive, and almost deserted portions of land were needed to test "the Gadget," the plutonium bomb. A stretch of desert called the *Jornada del Muerto* was thus selected and became Trinity site. The area is now known as the White Sands Missile

Range. In July 1945, the Z division was moved to the military-owned Oxnard Field in Albuquerque; today this locale is the site of Sandia Laboratories which is the third largest employer in the state (Alexander 3). In the decades following 1943, the revolution gradually extended to other parts of the state, bringing a new influx of employment and economic growth for service companies such as the Zia Company, the principal subcontract to LANL. Consequently, Albuquerque grew from thirty-five thousand people to more than a hundred thousand in ten years (Szasz, *Second World War* 306). The Sandia Corporation attracted newcomers and their families to city life as it employed about 10,000 in 1950. Ten years later, the city had already doubled its population of 100,000 (Nash, *Overview* 13). Today, installations linked to the Manhattan Project can be mapped out throughout New Mexico:

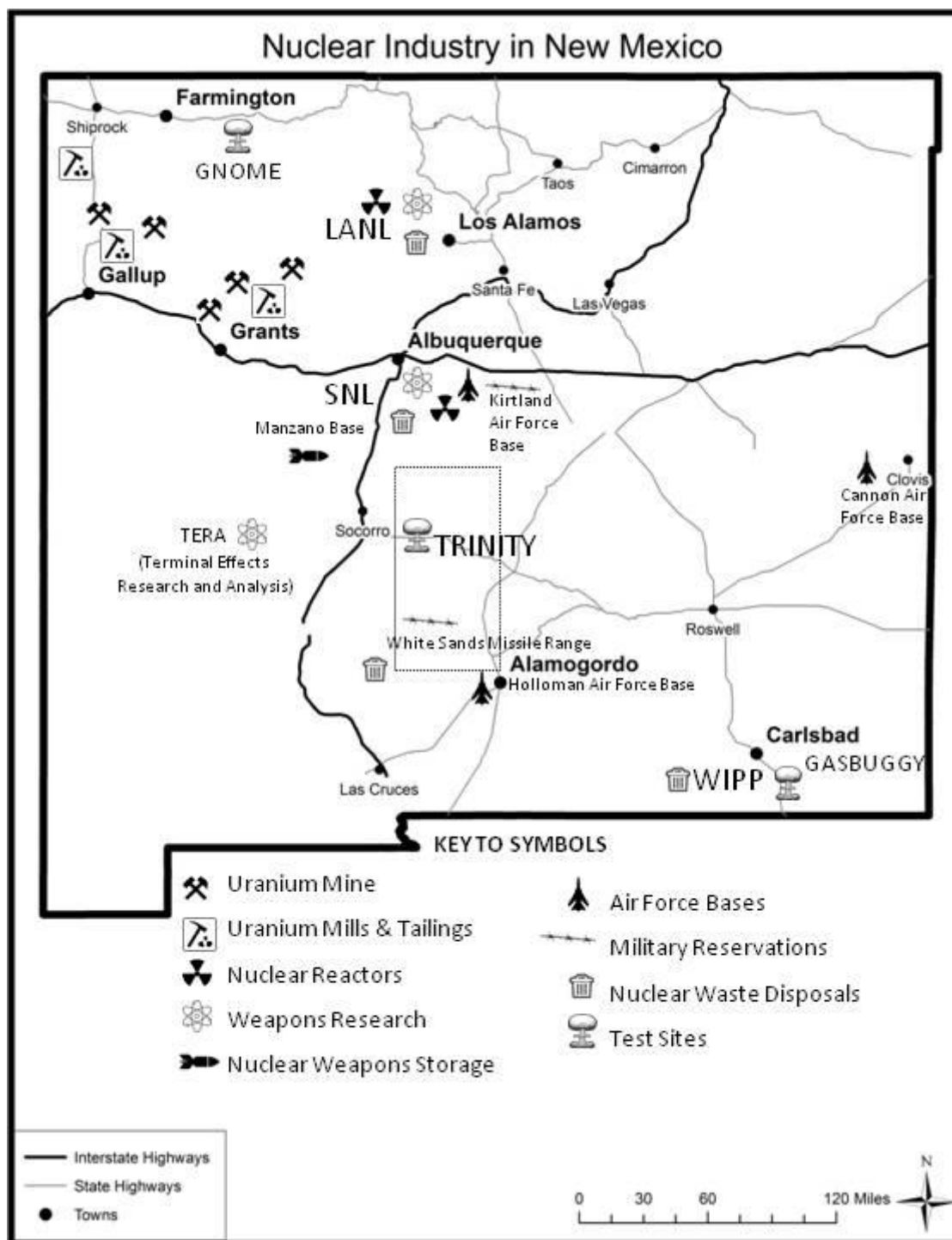


Fig. 1. Nuclear New Mexico Map, L. Genay.

The Manhattan Project definitely revolutionized New Mexico and propelled it from its preindustrial past into the future: a nuclear age. These events were perceived as godsend by local people and businesses that were able to benefit from the opportunities produced by nuclear economy. Nuclear science helped diversify the New Mexican economy and enabled the region to catch up on modernity in terms of employment, wages, education,

infrastructures etc. But these advances came with a price which proved to be heavier as truths about radioactivity and its dangers reached the general public. Local actors of the economy repeatedly faced the same dilemmas and the pressures of taking more risks for economic gain. These dilemmas are reflected in New Mexico's identity change.

II. New Mexico's Identity Crisis

The Manhattan Project modified New Mexico's identity as a romantic western state with pristine native cultures where to enjoy a healthy climate by adding the development of high-technology and nuclear science to its characterizing features. The Land of Enchantment also became known as the cradle of the nuclear age. As soon as the news of the secret laboratory on the hill and the Trinity test in the desert broke after the bombing of Hiroshima, local newspapers proudly insisted on the state's participation in the success of the Manhattan Project and reported stories, anecdotes about the secret city or the local witnesses or the Trinity blast.¹⁰ Representatives of the Alamogordo Chamber of Commerce even "urged that the site be made into a national monument" (Szasz *Brighter* 162). The pride of being the land where the atomic bomb was born translated into campaigns advertizing the nascent high-technology centers which needed to recruit the nation's top scientists and engineers. New Mexico's assets for investments and attractiveness were redefined by the addition of a new flourishing industry. Local businesses sought to make profits from this dynamism and individuals sought employment in the new facilities everywhere in the state. In the north, the development of a cash economy in what was a pre-industrial world introduced values centered on money. The system changed from a subsistence economy to wage work, and while trying to achieve higher pay some people became greedy.¹¹ Hal Rothman depicted how the Pajarito Plateau entered the industrial age; he demonstrated the dependency created by the application of industrial values on the peoples of New Mexico who lost most of their customary economies and life-ways in the adaptation process (21). The first generation of workers saw Los Alamos as an immense benefit for their communities in terms of the comfort it brought into their homes. Satisfaction and pride were their first responses

¹⁰ This is based on the content of the Ralph Carlisle Smith collection of papers on Los Alamos, the Ferenc Morton Szasz Papers, and the archives of *New Mexico Magazine* at the University of New Mexico Center for Southwest Research.

¹¹ Greed was not a very widespread tendency among the region's *Hispanos* before the development of a cash economy: "The most important civic virtue for a man to have was *verguenza*, a self-efficacy probity that restrained him from advancing himself at the expense of others" (DeBuys 195). Arellano argued that "lust for money supplanted intimay with the land" (36).

to their hiring at the new facilities. The salary they earned from these maintenance jobs enabled them to buy their first car or their first television set. Nonetheless, disparities such as those between Los Alamos and Espanola grew: Los Alamos was gradually made more attractive to appeal to young graduates all over the country and so it seemed to the people of the valley who did not have much that the Hill had everything – swimming pool, golf course, efficient and competitive schools. (UNM). The two communities scarcely socialized but they were both impacted by the same events happening in much higher sphere.

The difficulty of New Mexico's reshaping into an outpost of nuclear science was the development of a situation of increased dependence on outsiders.¹² Here began the downsides of the Faustian Bargain with science. The new face of New Mexico and its appeal as a national center for nuclear research and development was predominantly shaped by the federal government and the arms race. The exceptional circumstances of World War II and the Cold War were a *sine qua non* for the development of New Mexico's economy which became federally-sponsored. The funds were determined by these actors' needs and those needs were contingent on the circumstances created by the Cold War. Money influxes and contract numbers fluctuated with the incidents on the international scene therefore all participants in the economy were tributaries of events happening way beyond their borders. The pressures on local entrepreneurs and workers to make profit or to keep their jobs were even greater because control was almost entirely exterior. After a first booming stage in the arms race in the 1950s when programs and contracts poured in to prepare the Greenhouse and Tea-Pot test series, to produce the Hydrogen bomb and the first missiles, the state's too prominent dependence on military money revealed itself when research was redirected to ground war in Vietnam in the 1960s. The fiascos of the Gnome and Gasbuggy tests in 1961 and 1967 as part the Plowshare Program also proved that applying nuclear energy to peaceful purposes would be a major challenge and that local populations were called upon to take nuclear risks for profit (Szasz, *Larger*). In 1961, locals in Carlsbad were not eager to see nuclear science irrupt in their region even if it could bring a decisive economic boost. The plan was to use the explosion to create an underground heat reservoir that could be transformed into a power source. The stakes were high because if the test was a success, the

¹² Roosevelt's New Deal policies during the Great Depression introduced the concept of "big government" in New Mexico. Civilian Conservation Corps camps mushroomed throughout the state between 1933 and 1942 to alleviate the devastating effects of the economic crisis on the state which was combined with the terrible Dust Bowl drought. Postwar federal influence in the state built on these foundations.

economic prospects of a new way to produce electricity were immense but on the other hand, there were the risks of a nuclear blast: farmers were afraid of fallout for their fields of cotton, alfalfa, maize, barley, castor beans, and pasture grass; miners were afraid it might damage their potash mines and tourism professionals feared for their famous caverns. The test was deemed a success even if its main aim – to produce electricity – was not attained. Six years later, Gasbuggy was presented as the first joint federal government-private industry experiment. El Paso Natural Gas was the government's industrial partner: "the goal was to draw on underground nuclear detonations to improve gas flows from low-production natural gas fields" (Szasz, *Larger* 167). The blast would be slightly more powerful than Hiroshima and Nagasaki combined and was to take place in the San Juan Basin, just west of the Jicarilla Apache Reservation whose tribe approved the test for most of their income was derived from oil and gas. The conclusion was not brilliant either since the gas was very slightly increased and had become radioactive. By that time the public had begun to fear the effects of radioactivity because of fallout concerns at the Nevada Test Site and the consequences of strontium-90 absorption; they were not willing to take the risk of using that gas (Szasz, *Larger* 170). The two tests are good illustrations of the negotiations the government and big corporations conducted with locals to obtain their approval and use the land as they wished, always promising economic benefits for the area.¹³ Following these failed experiments, federal spending in New Mexico doubled again in the 1970s with the arrival of new programs such as the space shuttle, laser weaponry, and continued research on nuclear energy sources (Welsh 77). New Mexico representatives such as Senator Dennis Chavez also took part in the rush for nuclear monies by using their influence in Washington to attract more federal investment to the state. (Montoya 342). With each stage of the state's federally-sponsored economic development, competition with outsiders increased and a split appeared among the New Mexican population between those who had access to the nebula of research and development facilities which became known as the Rio Grande

¹³ Another compelling example of the political tensions generated by nuclear projects in the region was the opening the Waste Isolation Pilot Plan in 1999 after a twenty-year battle between anti-nuclear activists, environmentalists, and local boosters. For more information, see Chuck McCutcheon, *Nuclear Reactions: The Politics of Opening a Radioactive Waste Disposal Site*, 2002.

Research Corridor, and those who were left out (New Mexico Science and Technology Advisory Committee).¹⁴

These ups and downs on the whole industrial complex had correlative repercussions on poverty rates and quality of life for New Mexicans, who, for the most part, did not have the job security of out-of-state PhDs who came to settle in Los Alamos or Albuquerque after they were offered lucrative positions at the labs. These disparities appeared geographically throughout New Mexico. They underscored the loss of former ways of life, close to the land which was an inherent feature of New Mexican culture and the enduring poverty despite the benefits of the nuclear industry:

For the first time in 1950, half of all New Mexicans lived in cities [...]. Four thousand farms went out of production in the decade, and only nine of New Mexico's thirty-two counties benefited from the job growth and population increases. In the sixteen declining counties, federal spending was modest to nonexistent, and welfare and social security payments grew significantly as a result: 240 percent and 2,600 percent, respectively (Welsh 74).

So the new economic landscape of New Mexico not only changed according to the episodes in the confrontation between the two superpowers, but it also inherited a new unevenness in opportunities for the population, thus inevitably inciting competition among job seekers and increasing the value of the positions offered by the nuclear industry. The identity crisis between tradition and modernity appears in filigree behind statistics and economic reports as many had to let go of their ancestral rural way of life to leave for town and try to participate in the technological progress. The "nuclear rush" infused hope in many New Mexicans: jobs were available in places where there had formerly been no employment prospects. In Grants, in the San Juan Basin and Carlsbad, in the Española valley and Albuquerque, residents were attracted to the physically often less demanding and more lucrative occupations that also promised career opportunities. Those who left the rough labor on farms and in ranches for work at the laboratories trusted their new employers and their government who had taken the land in the name of national security. The post-war decades were marked by an unshaken trust in progress held by the government, the scientists and the public. But with the rapid industrialization and modernization the price of progress also began to show: New Mexico developed a two-speed pattern of development

¹⁴ The Rio Grande Research Corridor encompasses New Mexico Centers of Technical Excellence and Technological Innovation Centers in Los Alamos, Santa Fe, Albuquerque, Socorro, Sacramento Mountains, Alamogordo, White Sands, and Las Cruces.

which put into question New Mexican traditions such as the balance between men and their environment and at the same time augmented the discrepancy between beneficiaries of the industry and the deprived.¹⁵

Younger generations of local workers in Los Alamos began to criticize the barriers that were put up between the Hill and the valley that grew into a hindrance to their moving up the social ladder. Stories circulated which relate that young Anglos just out of school were made staff members on the spot when valley workers had to wait for several years to reach that goal. They reveal that some workers did observe discrimination along ethnic, geographical or educational lines (UNM). Frustrations eventually manifested themselves in the first discrimination lawsuits which were filed against the lab at the end of the 1990s and the land controversy centered on the Pajarito Homesteaders which started in 1997. At that time testimonies resurfaced that revealed some of the very first harmful sides of the project. Journalist Wren Propp reported for the *Albuquerque Journal North* that Hispanics removed from their land were "subjected to slave-like labor conditions, detainment under armed guards and involuntary medical experimentation" (2001). Propp quoted Sylvia Gomez, heir to the homesteader Jose Gomez, who relates how he was required to clean areas around the project believed to be contaminated by radiation for a \$2 daily salary. Doctors examined him every week, they drew his blood every 15 days and he was daily forced to drink an unidentified substance before leaving work (Propp). The fact that it took so long for these testimonies to resurface and these legal battles to be fought is indicative of the level of fear and pressure experienced by these people who could not afford to lose their new source of income.

III. What price New Mexico's Faustian Bargain?

The emotional impact of pressures to make profit on nuclear-related activities and take both environmental and health risks is best exemplified by the exploitation of uranium deposits in the north-western part of the state. The nuclear industry in New Mexico used to be a "cradle-to-grave" economy because it started with the mining of raw material and ended with the management and storage of aging nuclear weapons. The town of Grants once proclaimed itself the "Carrot Capital of the world" when it was a small community of

¹⁵ See works on the history of the land grant system such as Charles L. Briggs and John R. Van Ness's *Land, Water, and Culture: New Perspectives on Hispanic Land Grants* and William DeBuys's *Enchantment and Exploitation [...] or River of Traps: A Village Life* with Alex Harris.

farmers. With the discovery of uranium in 1950 by Paddy Martinez, a Navajo Indian from the area, the town soon became the "uranium capital of the world":

Before the end of the decade, new discoveries at nearby Ambrosia Lake brought five mills into operation in the region, and most of the workers lived in Grants. The town's population increased by 500 percent between 1950 and 1960. [...] In the bust of the 1980s, though, the dependency on the uranium industry wreaked havoc. As unemployment grew to over 30 percent, businesses closed, homes were sold at a fraction of their cost, and the population –once projected to grow to 100,000 – dropped from 20,000 to 10,000. (Amundson xix)

First because of the early monopsony established by the federal government and, then, the harsh competition once they entered the international markets, New Mexico's uranium producers struggled to keep the industry afloat until the last major uranium employer – Kerr-McGee operating as Quivira Mining Company – closed its mines and mill at Ambrosia Lake in early 1985 (Amundson 159). Today, the area of Grants still bears the signs of its boom and bust uranium history – abandoned mines, mills, and tailings. A museum of uranium mining is even there to recall this past. Tourism is now the region's main source of income along with three state prisons. But the highest price of this bargain was paid by the locals – mostly Navajo Indians – who were hired to work in the mines. These men and their families have had to deal with the fluctuations of the industry and with very serious health issues years later. The abundant literature about uranium miners provides the most compelling tales to illustrate the betrayal endured by the local populations.¹⁶ The term "betrayal" is recurrent in the narratives of those who were exposed to the repercussions of a nuclear science that evolved under a shroud of secrecy. Radioactivity is the paramount danger of the uranium and plutonium economy but the extent of its impact on the environment and on the human body was long kept a secret since the scientists themselves were struggling to evaluate the risks. Therefore, secrecy is the key term to understanding the sentiment of betrayal that is predominant among the public. Due to the Cold War, the federal government's actions and decisions related to nuclear weapons were all under a veil of confidentiality. The general public had no access to knowledge that was remotely linked to the atomic complex since it was automatically filed as classified information. The most disturbing fact about nuclear secrecy is that its purpose was not solely to keep the means of

¹⁶ See the following works: Doug Brugge and Esther Yazzie-Lewis, *The Navajo People and Uranium Mining*, Peter H. Eichstaedt, *If You Poison us: Uranium and Native Americans*, and Judy Pasternak, *Yellow Dirt: An American Story of a Poisoned Land and a People Betrayed*.

building a nuclear arsenal confidential but also to conceal "information about the health and environmental effects of the nuclear complex itself and other matters that might generate lawsuits. Indeed, at times, 'national security' has meant protecting the U.S. nuclear complex from U.S. citizens, rather than from foreign adversaries" (Masco 267). The fallout of this policy can now be observed in all parts of the U.S. where the nuclear complex was established but even more so in New Mexico because of its intricate entanglement with the historic development of this complex. The environmental legacy of the Manhattan Project is probably the heaviest price of New Mexico's Faustian Bargain with science which also affects the bigger portion of the population considering all the impacted areas (Price). The main recurring statement in the local population's discourse is that they had no knowledge of the dangers of radioactivity or at least of how dangerous it could be, even among those who worked at the laboratories or other installations dealing with nuclear energy (UNM; Brugge). If some felt cheated and angry, others thought the hazards of radioactivity were a necessary sacrifice for the economic development it brought to their state.

In terms of knowledge, radioactivity was known to be potentially dangerous since the nineteenth century, since Wilhelm Conrad Röntgen's discovery of x-rays and Marie Curie's work with radium. Despite the fact that radiation and radioactive objects were quite fashionable at the time of their discoveries, disturbing reactions among users of radium were sufficient warnings as to their harmful effects.¹⁷ The difficulty for scientists throughout the twentieth century was to determine exactly what dose of radiation the human body could take in and those numbers never ceased to drop, therefore the dosages which were used by the laboratories, uranium corporations, etc. to guarantee the safety of their workers were ceaselessly revised. In New Mexico, the environmental consequences of the nuclear industry are devastating as much for flora, fauna and humans.¹⁸ The dumping of liquid radioactive waste in canyons around Los Alamos started with the first experiments during the war. The Trinity test proved that the state of urgency during the war was detrimental to environmental and safety concerns because precautions proved insufficient. For instance,

¹⁷ Workers in watch factories, for instance, who applied radium-based paint to the hands of watches to make them glow in the dark, suffered jaw malformations and other health hazards.

¹⁸ Dangers come from the excessive presence of certain radioactive substances such as plutonium, beryllium, tritium, etc. in the soil, air and water. The consequences on plants can go to the disappearance of vegetation. On animals and humans, the outcome can be a variety of lethal diseases including many cancers (Widner; Niklaus; Masco; Price).

the Raitliff family was discovered shortly after the test: their dwelling and livestock was located in a place baptized "Hot Canyon" by the scientists. Their animals displayed burns, bleeding and loss of hair. The medical crew decided against evacuation but monitored them very closely in the following weeks (Hacker 104-105). Their case illustrates not only how little knowledge there was about the effects of an atomic blast and its long-term consequences for a specific area but also how the space and the people within the testing ranges were made a part of the experiment as variables or else, a way to collect raw data. Public knowledge has grown since the 1970s and the scandal of the Three Mile Island accident, and even more so after the Cold War as documents were declassified and new research was conducted. Journalist Vincent B. Price's alarming study of New Mexico's environment lays open the environmental damage caused by the scientific conquest of the region that he emphatically calls a "nuclear colonization" (2011: 33):

Soil and groundwater pollution is ubiquitous but almost invisible in New Mexico, especially in areas occupied by people who are not well-to-do. Many poor people, lacking economic clout, are relatively voiceless and hence less troublesome to corporations and governments than better-heeled Americans are. In isolated and impoverished neighborhoods in Albuquerque, in mineral-rich desert lands around Native American communities in western New Mexico, in towns around military R&D operations, and in small cities in the southeastern New Mexico oil patch known as little Texas, dumping toxic waste on the lands of vulnerable people is a common practice. (96-97)

Price points to the injustice of dangerous industrial practices and sheds light on environmental catastrophes that went, incredibly, unnoticed. He cites the Chuck Rock uranium mine accident as just one example where on July 16, 1979, "a dam on a huge evaporative tailings pond near a moderate-sized arroyo leading to the Puerco River burst, sending ninety million gallons of radioactive liquid and over eleven hundred tons of radioactive mill waste cascading toward Gallup and Chandler, Arizona" (139). Thus, even those who stand away from the lure of high technology to perpetuate ancestral ways and use the rivers and arroyos for their daily needs are exposed to the dangers. In *Tainted Desert: Environmental Ruin in the American West* Valerie Kuletz also uses the framework of colonialism, defining "nuclearism" as a form of "internal colonialism" to describe the environmental destruction orchestrated by the agents of the nuclear economy (7). She writes: "For the Native inhabitants of these places, military/scientific occupation meant, at best, low-paid jobs to help build, maintain, and clean the emerging cities. At worst, Indians

and other local populations were ignored completely – rendered invisible by a mixture of racism and a perception of desert lands as vast, uninhabitable wastelands" (43).

The injustice of "nuclearism" and of the environmental cost is even greater because of the socio-economic cost of the industrial bargain: both costs are interrelated. Fear of radioactive contamination of the environment and of getting sick spread along with the fear of losing one's job and falling into poverty. The nuclear complex increased some existing inequalities and created new ones, along new lines, in New Mexican society. There is no denying the improvement over the years – as far as jobs and life conditions are concerned – provided by such employers as the labs, the Sandia Corporation and the Department of Defense, demonstrated by a series of reports issued by New Mexico State University in Las Cruces (Cohen). Nevertheless, strong disparities within the state raise the question of how fairly benefits were distributed. In 1986, almost 70% of the population of Los Alamos county came from out of state, compared to 0.66% in San Miguel County, the county just east of Los Alamos; likewise, 3.5% of the Los Alamos population was under the poverty level with a median family income over \$30,000, compared to nearly 27% in San Miguel with a median family income three times inferior (Dietz 50). At the same time, New Mexico ranked second in doctoral scientists/engineers per 10,000 in the nation but 29th in number of High School graduates in the 1988 State Policy Data Book (Dietz 41). The figures illustrate the way Los Alamos stands out as an island of privileges exempt from the anxieties in the communities surrounding the town and the rest of the state. Moreover, being granted access to the Hill generated jealousies and rivalries in the valley. In the 1970s, lab workers from the valley were placed in an awkward social position:

Although their economic position was generally better than that of their neighbors, they were regarded in varying degrees as *vendidos*, or sellouts. Too few in number to constitute a strong middle class, such workers remained trapped between the increasing militance of Hispanos and their own psychic and material aspirations in the Anglo world of Los Alamos (Rothman 276).

The tension has grown in recent years because of the decline in the labs' activities and the subsequent layoff waves. All over the state, the same kind of inequalities and tensions can be traced back to the uneven distribution of opportunities to find work in these facilities. Moreover, since the beginning of the recruiting of scientific personnel, out-of-state PhD-holders had been almost systematically appointed to the highest, most prestigious and higher-paying positions, leaving almost no fair chance for graduates of in-state institutions of

higher learning to compete for those jobs. Thus, the nuclear economy created a pattern of social development based on the population's means of access to the technology corridor of New Mexico. Interviews with former lab workers from the Española valley show that opinions differ greatly from one generation to the next. On the one hand, old-timers who have known the hardships of agricultural life were glad to leave the backbreaking days behind and on the other a few younger people advocate for a return to the roots. Juan Estevan Arellano, writing of the situation around Los Alamos, summarized the predicament in this compelling manner:

El que pierde su tierra pierde su memoria (he that loses his land loses his memory), and no amount of money or technological advances will help us recover that loss. For some, Los Alamos has been seen as the Promised Land. For others, it has become an enigma, a virus destroying all the data on the hard disk with no way of retrieving it or saying it. The challenge for all of us is to find a way of rediscovering what we already have. Although physically in northern New Mexico, Los Alamos is really not part of the bioregion; like in *Gulliver's Travels*, it is a floating island. (32)

Arellano's nostalgia for the intimacy his people used to have with the land and his determination to reject the fantasy of Los Alamos echoes the regrets of many, like Paul Montoya, who have spoken of their love for the land and how that love remained in the bitterness of separation.

The colonial economy identified by Gerald Nash before the changes brought by the Second World War actually never disappeared but underwent a transformation of its sources of exploitation and shifted actors. Nevertheless, based upon the tales of New Mexicans' whose lives improved dramatically when they were able to find a job close to their homes, many seized the new opportunities provided by this system as long as they could collect its fruits. They trusted their government, army officials and the leaders of scientific progress to reward their patriotic sacrifices and their participation in the construction of the atomic complex. As the first benefits started to fade away and frightening consequences were revealed, the awareness of new generations grew with the realization that what their grandparents saw as a blessing turned out to be a Faustian bargain. The introduction of a cash economy brought in its wake new values revolving around money. A blinding spotlight turned towards this hitherto almost forgotten state when the news on the birth of the atomic bomb broke in

1945. The state has actively sought to remain in the light of science ever since, pursuing federal funds, boasting its resources and letting go of fragments of its identity and cultural heritage.

New Mexico's recent history presents us with the unique nature of the Faustian agreement that the less educated, impoverished and isolated New Mexicans made with the federal government seventy years ago, trading land, ancestral self-sustaining life-styles, a sane and safe environment for the short-term financial benefits which the state received but which, by and large, did not reach the residents individually. That bargain may have been the seed of an incredible scientific revolution but this revolution transformed itself into a conquest at the expense of local populations who were able to add comfort in their lives but who also were allotted a status of inferiority in comparison to the new educated groups who poured into the state. In 2008, New Mexico ranked fifth in the number of persons below the poverty level with 17.1% of the population and 44th in median household income of \$43,508 (U.S. Census Bureau). This observation affirms early suspicions that, eventually, a great majority of the state would remain impoverished. Yet in addition, local communities now also suffer from tremendous environmental damage and from the gross economic disparity fueled by a dangerous dependency on the labs whose future is increasingly uncertain and on fluctuating federal funds. This situation produces a climate of latent fear in New Mexico: fear of losing jobs, of health issues, of nuclear catastrophes, of attacks. This sentiment is absolutely part of the emotional legacy of the Manhattan Project in New Mexico.

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