promote biodiversity. With tree-ring scars it established an average fire return interval of five years. It showed to officials, influential ejidatarios, students, and fire crews how to do controlled burns and what such fires could mean for all of them. It supported a flourishing, full-spectrum educational ecosystem of student theses. Even as fire interest propagated among research agencies and universities, notably UNAM and the Universidad de Guadalajara, Proyecto Ajusco reestablished UACh as a major center for fire studies.

Granted its standing as one of the largest megacities on Earth, roughly half of Mexico City was still rural, or at least not wholly urbanized. Since most fires started from traditional usage such as pasturage, flame and smoke were a perpetual reminder of Mexico's incomplete transition to a developed country, and of the political accommodations even public lands had to make. Increasingly, the lands served another transient population: tourists and recreationists. On the first issue, Proyecto Ajusco showed that routine surface fire did no irreparable damage, but could actually promote ecological health as well as reduce combustibles that could stoke major fires. On the second, it found through surveys that scenes recently burned and renewed were viewed more favorably by visitors than unburned sites. There was no justification for a total fire ban, only discussions over what form fire should take.[191]

The project inevitably devoted an immense amount of attention to the Mexican mountain pine (*Pinus hartwegii*). No other Mexican species has had so much research devoted to its multiple adaptations to fire. Situated on a volcanic mountain subject to routine disturbances, it should surprise no one that a tree that has evolved to withstand wind, drought, quakes, and eruptions should also accommodate fire. But the project went further. It made the Mexican mountain pine a poster child for integrated fire management, what Rodríguez Trejo considered Mexico's answer to the longleaf and ponderosa pines that advertised fire in the southeastern and southwestern United States.[192]

Proyecto Ajusco was too vibrant and valued to remain tethered to Mexico City. It provided a platform and model that quickly expanded throughout central Mexico. Then it went further, taking on assignments that spanned Mexico overall, supporting students from Chiapas to Chihuahua and from Guerrero to Quintana Roo. The more it did, the more it inspired. From the summit of Ajusco it was possible



to see the pyrogeography of Mexico, and from Mexico, large swaths of the previously invisible fire world that was Earth.

## *ERUDITO* ON FIRE: DANTE ARTURO RODRÍGUEZ TREJO

If a single career could stand as a synecdoche for Mexico's Red Revolution, it surely belongs to Dante Arturo Rodríguez Trejo. Not only did he live through the revolution as a student, researcher, consultant, professor, and participant, from the earliest Marana classes to the Coahuila megafires, but whatever he personally didn't experience, he knew those who had, many of whom he worked with and not a few of whom he had taught. He mentored students, worked with administrators, translated fire science to Mexican conditions, and hosted international visitors. But above all, he wrote. Unlike most fire people and scientists, he liked publishing. Through presentations, journal articles, and books, he became not only one of the founding fathers of the Red Revolution, but its encyclopedist, synthesizer, and chronicler.

His father, Maximino Rodríguez Aguilar, hailed from Oaxaca. Maximino had grown up without a father but was determined to study, and with the help of an uncle he attended a boarding school, then kept on struggling in order to continue to the National School of Agriculture, where he graduated in 1949 as a forest engineer. Dante's mother, María Dolores Trejo Vázquez, was born and raised in Texcoco, where she worked in a beauty salon, and it was in Texcoco that she and Maximino met and married. Dante recalled Maximino as "rigorous, disciplined, and fair"; María Dolores was "very loving, and pampering, but also disciplined." They had ten children.[193]

Dante considered his childhood a privileged one. His parents enrolled him in kindergarten when he was two, and in primary school at age five. They loved to read, kept books in the house, and named him for Dante Alighieri, all of which nudged him toward writing. When he was six, Mexico City hosted the Olympics, which inspired him to dream of a career as a sprinter. When he was seven, he began accompanying his father on forestry assignments. Maximino traveled throughout the country, and at one point the family spent three years at Huixtla, Chiapas, before returning to Texcoco, where Dante completed secondary schooling and college prep before following in his father's footsteps at UACh,

graduating in 1983 in forestry. Meanwhile, the national economy had collapsed, and Dante's dream of becoming a forester seemed as delusional as his aspirations for the Olympics.

He got hired to work for COCODA (later, COCODER). Antonio Sierra Pineda was organized and visionary, and became for the young Dante "a second father." At COCODA Dante was introduced to fire as a practical subject. In October 1984 he joined the Mexican contingent to the second Marana course. So much of what he learned fascinated him: applied meteorology, the intricacy of forest combustibles, terrain effects on fire behavior, crew safety, financing, prescribed burns, fire suppression equipment, strategy and tactics, the Albini nomograms for predicting fire spread rates (which seemed "magical")—all of it "a world of new information." It was his first international trip, and with it he found his vocation and a cohort to share it with. "If my father motivated me to be a forester, Sierra Pineda and this course kindled a professional flame." At 22 he resolved to dedicate himself to the study of fire.[194]

The course aroused his interest in two fields of study in particular: forest ecology and physics, expressed as fire behavior. Attending the course allowed him to reposition himself within the Comisión de Recursos Naturales (CORENA, which had absorbed COCODA), to engage with fire as both a participant and an instructor, and to experience his first prescribed burn. He co-directed with Sierra Pineda the country's most extensive inventory of forest fuels (a "memorable experience"). The two men then worked to outfit the first fire dispatch center in Mexico. He oversaw the academia de ecoguardas, drawn from students at the centers of environmental education, as they worked on the lower flanks of Ajusco. In 1989 he was accepted into the National Academy of Forest Sciences as an academic collaborator. It was a second schooling, in which he learned about fire on the ground, not in a classroom—fire was hardly taught at all, anywhere. But his scholarly instincts were not dormant. "Always I have liked to publish." All this activity led to his first publications—a synthesis of the literature on Mexico's fire ecology and, harking to the enduring appeal of athletics, a study of the physical attributes suitable for firefighting.[195]

It all made a strong résumé, and because of it he was offered a position as subdirector. He declined, as he declined similar offers throughout his career. Why? His secret dream was to become a research professor. He relished the university; he was at heart a teacher and scientist, not an



administrator. Moreover, there was so little known about fire in Mexico—it was "practically virgin" territory—and fire's ecology was the foundation for everything else. Sierra Pineda, now with Probosque, invited him instead to take responsibility for fire protection in Texcoco, which allowed him to work toward a master's degree at the Colegio de Postgraduados. For his thesis he analyzed the economic efficiency of fire management in Mexico City. That took him into the library as well as the field, and it confirmed that a university professorship was his most desirable, if not yet an attainable, dream.[196]

The next fork in the road came with an offer of a temporary post at UACh to teach while writing a guide to fire prevention and suppression. The university he regarded as "a noble institution," at which he could help others, as UACh had helped his father and himself. Regardless, he declined the invitation and from 1992 to 1995 worked on the guidebook as an academic collaborator in the National Academy of Forest Sciences. Taking the offered temporary post, he felt, would disrupt the career he had advanced over the past eight years, though the ecologist in him noted that "perturbation and regeneration are related."

Meanwhile, the text had lengthened over the course of three drafts and nearly four years. In 1994 *La lucha contra el fuego* (*The Fight Against Fire*) appeared, followed two years later by a 630-page book that summarized all aspects of Mexican fire. When *Incendios forestales* was published, the world literature could almost be tallied on one's fingers—one book dealt with the fundamentals of fire ecology, two books with the fire ecology of North America, one with the fynbos of South Africa, two with Australia's biota, and two with the circumpolar boreal forest. The United States had three general texts on fire management (one outdated but still in print), and Australia had one. Mexico joined a select club of countries that could boast of having not only a serious fire scene but a scholarly treatment of it.[197]

Despite the book's bulk, Dante knew its limitations. There simply wasn't enough known about fire in Mexico, not even a cursory survey; that information would have to be created. Dante moved on to a doctorate at the University of Florida, where he looked at regeneration in longleaf pine, with study plots at the Joseph W. Jones Ecological Research Center. Anything to do with longleaf involved fire, usually sooner rather than later, so in researching fire and reforestation Dante was studying,

in a North American context, the twin obsessions of Mexican forestry. Not least, Florida was the epicenter of prescribed-fire enthusiasm in the United States, and it was the University of Florida, and later the Nature Conservancy in Mexico, that gave Dante the final push to convert to integrated fire management. Though fire ecology and prescribed fire were, so to speak, in Florida's air and water, it is revealing that even at the University of Florida there was no graduate course dedicated to fire ecology.

The doctoral program lasted from 1996 to 2000. The university was a "great stimulant," but Dante's years there were undeniably hard. He was married, with one child, and spent these four years away from his close family; he was in a foreign land where Spanish was not the prevailing language; even his mother died his first year away—the doctorate brought "unexpectedly great challenges" and left a "permanent mark." But those years were critical and fondly recalled, and they positioned him ideally to ride the wave of money and interest in fire that followed the 1998 outbreaks, which occurred halfway through his stay in Florida. (Even Florida had a record fire season that year; it was during a small symposium on the fires that Dante met Ron Myers of TNC.) Not least, those years launched him on his vision quest to find where possible, and to create where necessary, all the information required to understand fire's ecology in Mexico, and to write it up. Until it was written, it wouldn't be real to those who made policy.[198]

He was indefatigable. When he returned to UACh, he conceived the notion of Proyecto Ajusco, taught courses on fire ecology and management, accepted students for advanced degrees, and dedicated himself in particular to the fire-adapted Mexican mountain pine. He connected with the other pioneers of the new era—it was not a large fraternity. With two Mexican colleagues and one American, he wrote a short introductory text for students, *Educación e incendios forestales* (2002). With another U.S. colleague, Pete Fulé, he wrote about fire management and restoration in Mexico's pines. With Roberto Martínez he surveyed the state of fire in Mexico and Mesoamerica; for *Ambio*, he offered a tutorial for a global audience. He was a part of the UACh cadre that evaluated CONAFOR's fire capabilities from 2004 to 2008 and generated a supplemental assessment of the agency's corps of firefighters. With Germán Flores he coordinated publication of the 2006 symposium organized by CONAFOR. He knew Ron Myers, whom he regarded as



a pillar of integrated fire management throughout the region; he frequented TNC's "legendary workshops"; and he participated in the 2006 Berkeley gathering at which TNC conducted its reconnaissance of fire on Earth. With Myers he wrote an article about using oaks as a guide to restoring fire in pine-oak forests, and a chapter on tropical pine ecosystems for a major text. He was active in the reforms that put Chiapas in the vanguard of Mexican fire management, with special focus on Villaflores. He wrote a guide to prescribed burning for FMCN, CONAFOR, and CONANP. He presented Mexico's fires and their management to international symposia. Out of Proyecto Ajusco came a future generation of Mexican fire specialists. He worked with Roberto Martínez and Alfredo Nolasco to amend the legal standing of controlled burning. He even served as coordinator for the fire brigade organized at UACh in 2008, which was active in the 2017 Tláloc fire. He self-deployed to the 2011 Coahuila conflagrations and offered a preliminary assessment—fire in arid zones was not well understood. That Mexico, "with a bit of luck," had withstood the fires he took as a measure of the lessons it had learned since 1998.[199]

Then, in 2014 and 2015, he published his *summa summarum*—a magisterial two-volume, 1,705-page panorama of Mexican fire; all fire's ecosystems, all its regimes and behaviors, all its history. As the title indicated, *Incendios de vegetación* (*Vegetation Fires*) ranged beyond forestry, and as its bulk testified, it sought to be as comprehensive as possible. Fifteen institutions contributed funding toward its publication—UACh and the Colegio de Postgraduados, of course, but also all the Mexican agencies with fire responsibilities, and even the U.S. Forest Service and USAID. Only someone who had grown up with and participated in the grand swell of reforms and research—had absorbed it bit by bit, wave by wave as it evolved—could have imagined a project at such a scale or dared to undertake it.

It's a strange book, unlike anything else in the global literature on fire, nearly all of which has emerged out of scientific research and reads like compilations of data. Dante's bursting tomes stand by themselves. Perhaps their closest analogues are the immense volumes penned by Spanish scholars who lived in Mexico in the sixteenth century—the *Cosas de Nueva España*, the *Historias de Indias*—that recorded everything from events and places to flora and fauna. Vital or tangential, everything pertaining to fire Dante included, and what didn't exist but was needed, he

would create through the research embedded in Proyecto Ajusco. The works of Oviedo, Las Casas, Durán, and the others had disappeared into archives, only to be published centuries later as historic relics. Dante's were released to the world.

Like those predecessors, Dante had encountered a previously undiscovered world, a world of fire, and he was determined to describe it in all its strangeness, practicality, and power. He assembled information not only from the natural sciences, but from myths, paintings, fire behavior and fire ecology, and the history of fire protection and fire research, with photo galleries of every significant personage—all in all, every imaginable aspect of fire in Mexican land and life.

Yet he knew how fragile reforms could be in Mexico, where institutions could be spun about or blown away with each sexenio. Too many reforms were still impermanent, and too much funding could be arbitrary. Paradoxically, CONAFOR's successes led to reduced budgets; after 2011 its finances were cut by 30 percent. Dante knew that "practically all of the population, urban or rural, visualizes only the negative side of the fire." New officials viewed prescribed fire with suspicion. The state government in Chiapas, presented with a world-class model for integrated fire management, sought to restrict, not expand, controlled burning. The 2019 fire season was the fourth-worst on record, with eighteen fatalities.[200]

Dante had lived through it all, and always he had written (and not just about fire; there was a short popular book on Mexico's trees, and, completing the track loop, the former runner even published a book on athletics at UACh). Always, in writing as in teaching, he felt it was important to communicate "con pasión." Yet passion needs discipline and tenacity, and these traits Dante learned from his parents; those virtues were reinforced as he traversed one crossroads after another. That, as much as timing, explains his achievements, as the would-be sprinter became the marathoner of Mexican fire research; the eager student, an honored professor; the aspiring writer, the great encyclopedist of Mexico's fire ecology and the chronicler of its fire history.[201]

## MEXICO JOINS THE NEW WORLD ORDER ON FIRE

In the handful of years that followed the 2011 fires, Mexico's Red Revolution climaxed. Integrated fire management was established as the



consensus concept. Model research programs and fire demonstration sites existed. Prescribed fire in forests was legalized. Wildland fire was taught in universities. Fire suppression had capability. CONAFOR's fire program had a handsome center for dispatch and operations in Zapopan. Rodríguez Trejo's *Incendios de vegetación* brought the whole subject—its data, its methods, its history, its people—into formal scholarship. An enterprise that 30 years earlier struggled to cope with fires, that had almost no knowledge of fire's behavior and effects outside of personal experience, that shunted fire among agencies that didn't care about it, had leaped into the top tier internationally.

But Mexico achieved global standing just as the globe was in a fire-informed upheaval. The developing world glowed with burns from traditional practices, amplified by massive land-clearing fires in rain forest and peat. The developed world rediscovered wildfires it thought it had banished or stuffed into tidy boxes for filing in archives. Even Mexico's aspirational peers found themselves nearly helpless as megafires overran all their vaunted machines. Australia suffered an outbreak of epic bushfires in 2019–20 that blasted its eastern seaboard, submerged Sydney, Canberra, and Melbourne in deadly palls of smoke, and sent a smoke plume around the globe. Even before it invaded Ukraine, Russia was helpless before immense fires in Siberia. Fires and heat waves hit Britain, Sweden, Germany, and France like a returned plague. Subsquently, fires continued to hammer Mediterranean Europe with appalling casualties; Greece and Portugal burned with a savagery worse than anything Mexico had endured in its catastrófica temporada. Fires blasted over tourist meccas in Maui and Rhodes. Even Greenland burned. Dozens of disciplines that had ignored fire as a subject now raced to absorb it.

The notion was broached that humanity's fire practices, both from living and lithic landscapes, had become so powerful that they were informing a fire age. Earth was experiencing a matured Pyrocene.

As with other countries that had undergone the transition, the world Mexico entered was not the world it had expected. Originally, the competition between the two realms of combustion was welcomed: fossil biomass was the means to power and modernity that would lift the republic and its peoples into wealth and well-being. But the many fire Mexicos coalesced into two Mexicos. Then, as fossil biomass replaced