



ANCIENT

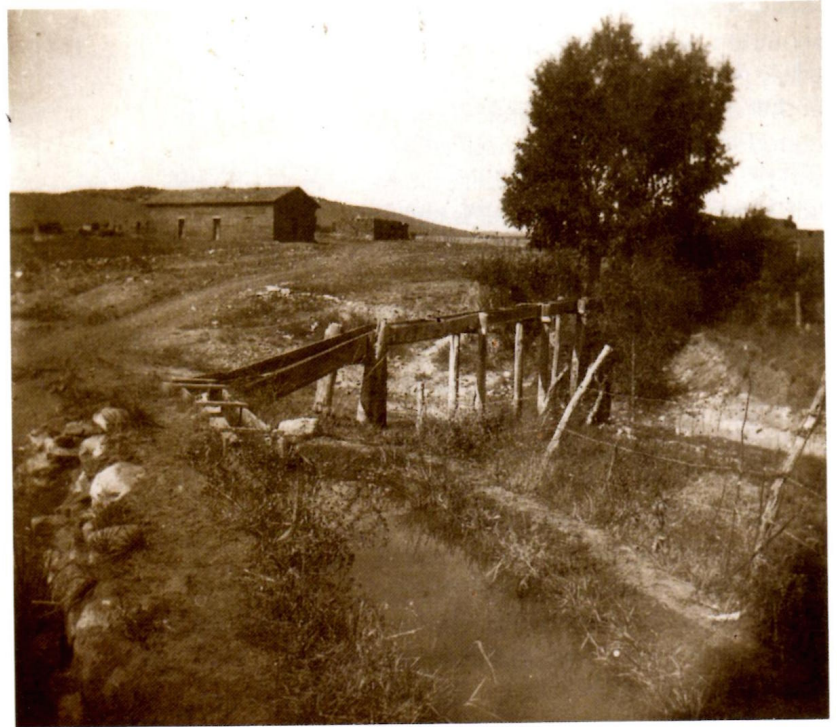


A group of farmers in northern New Mexico prepares for the annual spring cleaning of their communal irrigation ditch. Below right: A similar ditch in around 1900.



New Mexican farmers rely on irrigation systems that have been in continuous use since the earliest Spanish settlers arrived. The way they run them goes back to Spain, with roots in the Spanish Moors' beginnings in the ancient Near East.

by Aurelia C. Scott



The men are gathered at eight o'clock in the cold, clear air of a late-April morning. Most have walked to the meeting, carrying long-handled shovels and bramble cutters on their shoulders. In groups of two or three they have ambled along the dusty gravel road overlooking New Mexico's Valdez Valley until they reached the unmarked bend that serves as the meeting place. Others came crowded six to a pickup cab, then spilled out and grabbed shovels and hats from the back of the truck. They have come to clean their irrigation ditch, the Acequia Madre del Rio Lucero, as their community has done every spring for more than 175 years.

The *mayordomo* arrives at eight-fifteen. By eight-twenty-five the *parciantes* (members) are following their aged leader to a field near where the ditch leaves their property and becomes the responsibility of the Revalse Acequia. As the men collect around him, the secretary pushes his hat back on his head and calls the roll.

"Garcia . . . Rodriguez . . . Martinez . . . Montoya . . . Tor-

TECH

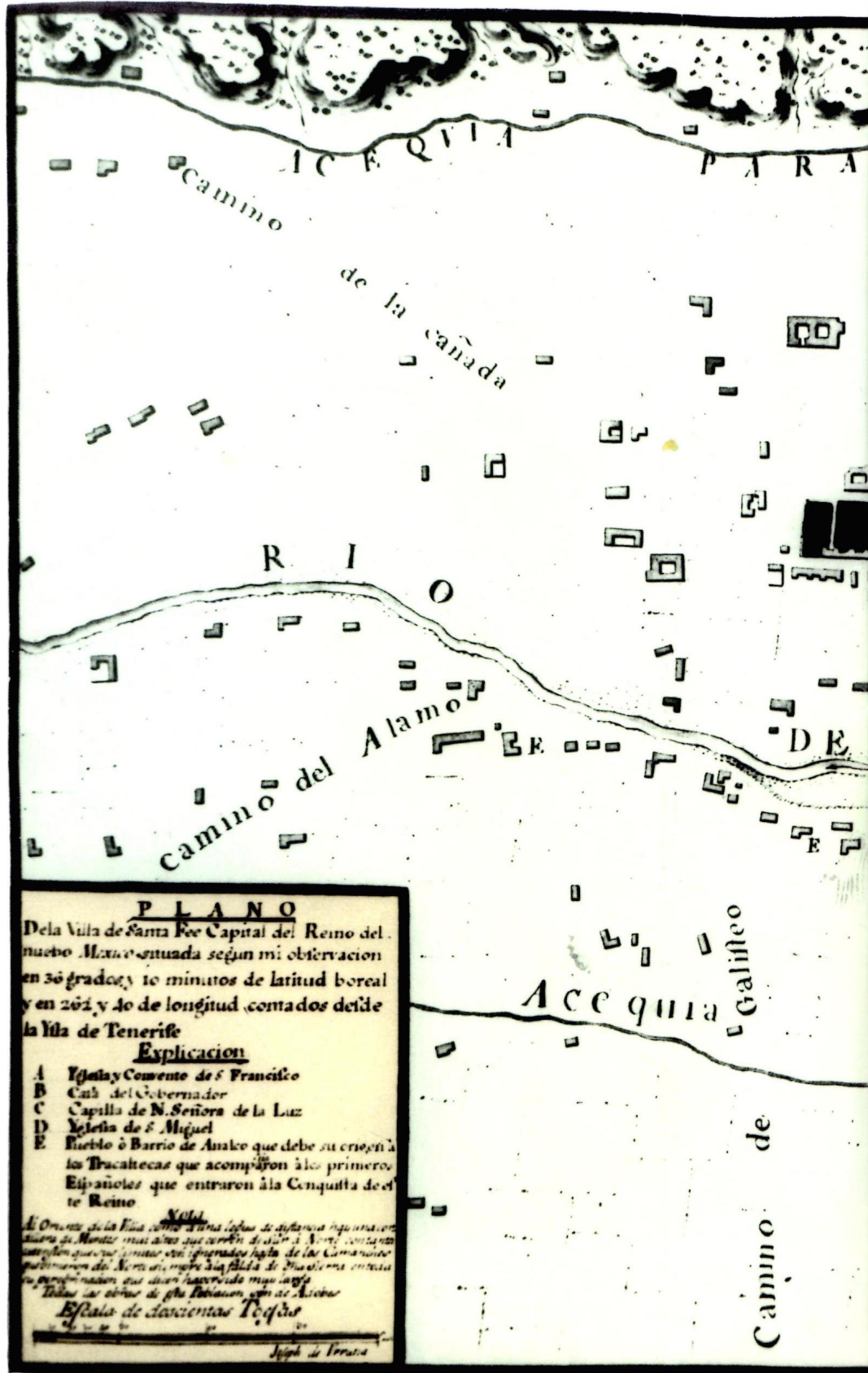
res . . . Valencia . . .,” he chants. Only a few Anglo names break the rhythm. Fifty men, aged sixteen to seventy, answer the call and follow the *mayor domo* to the edge of the ditch. They are ready to go to work, just as their ancestors did when this land belonged to the King of Spain.

The Acequia Madre del Rio Lucero is one of approximately seven hundred irrigation-ditch associations in northern New Mexico that were founded by Spanish colonists in the seventeenth, eighteenth, and early nineteenth centuries. Recent years have seen the construction of several major dams and water projects in New Mexico, but even in this high-tech age, acequias—maintained with shovel, hoe, and sweat—carry the lifeblood of water from mountain rivers to the terraced fields below. They also carry the history of Hispanic New Mexico.

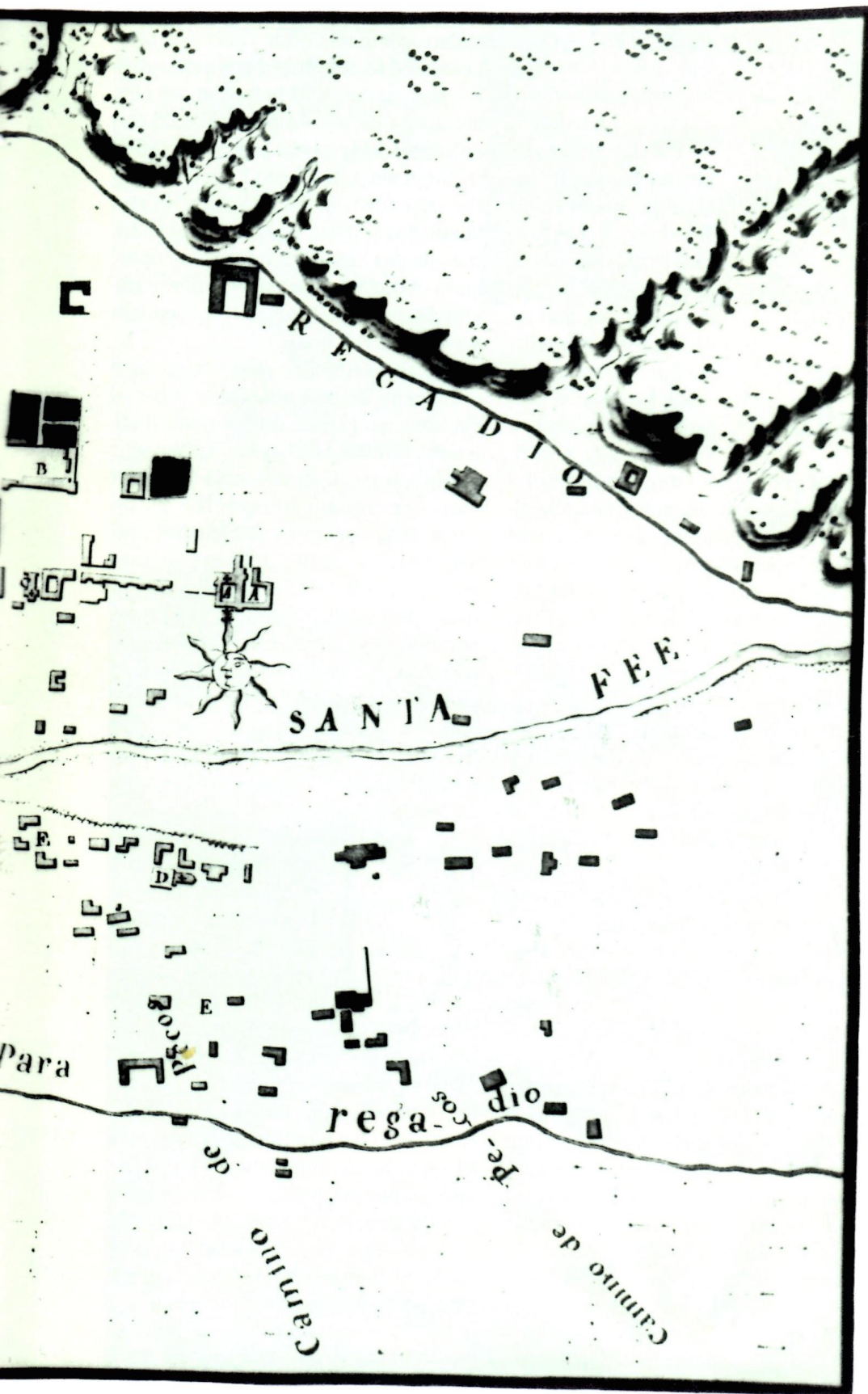
That history began in 1528, when Nuño de Guzmán, governor of New Spain, heard an Indian tell of a happy country to the north that abounded with gold and silver. Over the next fifteen years stories multiplied of rich, fertile places, but none could be found, and eventually the Spaniards decided that the Indians were pulling their legs.

In the 1580s and 1590s exploration fever flared up again, and more parties headed north in search of mineral wealth, land to colonize, and souls to convert. The most ambitious of these was mounted in 1598 by Don Juan de Oñate, a wealthy Mexican mine owner who had been deputized by the Spanish crown. He founded the first permanent European settlement in New Mexico, and on August 11, 1598, his group of pioneers began a system that persists to this day when they dug their first irrigation ditch.

The Santa Fe Valley, along with much of northern New Mexico, was then much as it appears today—a fragile, semi-arid landscape. The soil is adobe clay, with sand along the river’s edge; the growing season is short, the altitude is daunting, and the winters are



A 1766 map drawn by José de Urrutia shows acequias in the city of Santa Fe, which was founded by the Spanish almost two centuries earlier.



chilly. With the rainy season limited to afternoon storms in July and August, dryland farming, which relies on rainfall, is not feasible. Water for crops must come from streams and rivers. The land must be irrigated.

The native people had long understood the need for irrigation. When Francisco Vásquez de Coronado rode north in 1540, he observed that the Pueblo Indians "cultivate the ground in the same way as in New Spain." A member of the Antonio de Espejo expedition in the 1580s saw "many irrigated cornfields with canals and dams, built as if by Spaniards."

The northern Pueblo Indians of the time used a combination of methods to water their crops. Before planting, and on occasions of great water runoff, fields near riverbanks were flooded to saturation. Crops in more distant fields were watered by shallow canals. When the runoff dwindled late in the planting season, the Pueblos built check dams of stone, mud, and brush to steer what was left into canals and onto the fields, which were often terraced. Although the crops, mostly corn, beans, and squash, were cultivated by individual clans, water was a precious common resource that belonged to an entire pueblo, or village.

The Spanish settlers came from a climate similar to the one they encountered in the New World. Like the Indians, they had a long tradition of using irrigation canals and carefully husbanding water. The Moors had developed a complex system of water regulation during their stay on the Iberian peninsula, and the Spanish had kept it mostly intact after they regained control of their country.

The Moors, following principles clearly rooted in the arid lands where Islam arose, had encouraged the Spanish to build permanent irrigation canals, operated by associations of water users. When they colonized the Americas, the Spanish brought this system of irrigation with them.

Immigration to New Mexico was slow for most of the 1600s, and a Pueblo Indian revolt in 1680 drove the Spaniards completely out of the territory



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for more than a decade. Early in the next century, however, after Spanish rule had been re-established, settlers once again began arriving in force. For protection from marauding Apache and Comanche Indians, they stuck close to the somewhat less inhospitable northern pueblos.

Since they lacked even the simplest metal implements, the settlers relied on wood and leather for almost all their needs. Isolated from the rest of New Spain by rugged mountains and harsh weather, they adopted the irrigation practices of the Pueblo Indians. The Spaniards' traditional lined culverts and water wheels gave way to gravity-flow canals dug into the adobe ground, which were easier to build and maintain with limited tools and labor. Since no quarrying equipment was available, earth or brush diversion dams replaced stone.

Other aspects of life changed as well. Local custom and consensus replaced legalistic rules as a means of resolving disputes. Barter took the place of money. Animals grazed on common lands owned by the entire community. And acequias—community irrigation associations—became the central governing institutions of the remote northern frontier, exercising control in all areas of life. In Moorish Spain, by contrast, water associations had been just one organ of local government.

A community's main acequia, the acequia madre, was public property and provided all the water to meet the community's domestic and agricultural needs. Generally it began at a diversion dam on a local river and later rejoined that river downstream. The length of the acequias varied greatly; some were two or three miles long, while others, like the Acequia Madre del Rio Lucero, flowed for ten miles before meeting the river again. Water from the acequia madre was distrib-

uted around the community through lateral canals. Whenever necessary, smaller ditches then carried water from the lateral canals to individual properties. Members of the community dug every foot of the acequia madre, lateral canals, and individual ditches with picks and shovels made from wood and stone, along with a few carefully hoarded and preserved metal implements.

Because of the amount of labor needed to dig and maintain acequias, water was rationed carefully. People could be fined or otherwise punished for taking too much of it, for taking it at the wrong time, for not helping maintain the acequia, or for bathing in the acequia or the public well.

Although the acequia madre itself was public property, the right to use its water belonged to the owners of the land it irrigated. Tradition dictated that water rights attached to the land through which the water flowed, not to individuals. Selling a piece of land meant selling its water rights as well. When New Mexico became a United States territory in 1850, this tradition would clash painfully with the Anglo tradition of water as a separately salable commodity.

By 1850 more than 150 acequias were in operation. One of these was the Acequia Madre del Rio Lucero. Starting near eleven thousand feet in the canyons of Vallecito Mountain north of Taos, the Rio Lucero runs gradually south to join the Arroyo Seco, the Rio Pueblo, and the Rio Fernando five miles south of Taos. Since Spanish colonists first added their villages to the long-established Indian pueblo on Taos's fertile plateau, the pueblo and the neighboring communities of Arroyo Seco, Des Montes, El Prado, Las Colonias, and Taos have used these rivers for irrigation water.

The story of the Rio Lucero acequia

begins in 1811, when Mariano Sanches began selling lots from a parcel of land he owned to settlers who would agree to clear timber and help him set cornerstones for a town plaza. In 1815 the colonists dug their acequia madre through what had been Indian land to the new town of Arroyo Seco. In the Spanish tradition, it was regulated by the village elders, but day-to-day operation of the acequia madre and the lateral ditches was delegated to a *mayordomo*, or ditch boss.

The *mayordomo*'s most important responsibility was allocating water—deciding who could divert it into their lateral ditches and when. This could be an easy job in a wet year and a tense one during a drought. The *mayordomo* also oversaw the cleaning and maintenance of the ditches by community members, charged fees to those who did not contribute labor, and imposed stiff fines on those who polluted the water or took it without permission. Stealing water sometimes resulted in more than just fines; one observer noted that “blows which always bring sad results” were the typical reward.

Upon becoming a United States territory in 1850 and a state in 1912, New Mexico underwent what some called necessary modernization. An Anglo-American form of county government was organized, providing formal arbitration of conflicts and an official depository for records. The new government also brought wrenching change to the isolated mountain villages of the north. Conflicts among Spanish families, and between Spanish and Indian people, that had formerly been resolved through personal, though not always peaceful, negotiations, were taken instead into an Anglo legal system. This system emphasized private property, whereas the Spanish and Indian inhabitants grazed flocks on common land. And the United States government believed in taxes and a cash economy, alien concepts in the barter

system that prevailed. Hispanic New Mexicans' wealth lay in their land, and in the water deeded to the land. Starting in 1850, they began to lose that wealth.

Common lands were the first to go. Distrustful of an English-speaking territorial government asking them to register land their families had used for generations, and bewildered by the complicated documentation that was required to do so, Spanish-speaking New Mexicans often did not file claims. In addition, Anglo law required land to be registered to a single owner; the concept of holding land in common did not exist. Overlapping and conflicting grants that had built up over several centuries compounded the confusion, and plagues of lawyers and carpetbagging speculators descended on New Mexico to take advantage. Even when the cash-poor did manage to acquire title, they sometimes could not pay the taxes they were assessed.

In these ways much common grazing land, which had been set aside for the use of a specific community or clan, was lost. It fell into the public domain, meaning that the federal government owned it. Anyone, including a new settler, could lease the land, use it for his own purposes, and keep everyone else out. This put an end to livestock farming for the Spanish-Americans and left small, irrigated fields as their only source of livelihood.

Since the founding of Spanish New Mexico, the owner of any land along a stream had been entitled to use water from it and had been expected to use that water only for beneficial purposes, mainly meaning household uses and small-scale agriculture. That was not the expectation of the miners and ranchers who arrived in force in 1850 and again with statehood in 1912. Profit and growth, not subsistence, were their goals. Squatting on public land that had once been held in common by Spanish families, the miners formed influential associations to lobby for their use of the land and water. When the new government granted that use, New Mexico's land and water began to change. Miners need a great deal

THE HOHOKAM:

Their sophisticated irrigation systems made the Arizona desert bloom a millennium before Columbus

Long before the Spanish settlers, and long before the Pueblo Indians, a vanished people built extensive irrigation canals in a corner of the Southwest. From about A.D. 300 to 1400, the Hohokam inhabited the arid region that is now south-central Arizona, around the modern-day site of Phoenix. Today's Pima Indians gave the Hohokam their name; it has been translated as "all used up," "the ancient ones," "people who have gone," and similar phrases.

Excavations at Snake-town, Arizona, in 1934 yielded the first detailed knowledge of Hohokam culture. Since then archeologists have debated the origins of the Hohokam, who appeared suddenly in the Southwest with no known antecedents. Some scientists believe that they were migrants from Mesoamerica who moved north from what is now Mexico sometime around A.D. 300; others believe they descended from earlier native peoples. As with most matters relating to the Hohokam (such as their peak population, for which estimates range from 50,000 to 400,000), there is considerable scholarly debate over when the Hohokam first appeared in Arizona. Some date their advent as early as 300 B.C.

The Hohokam were an agricultural people who supplemented their pri-

mary crop of maize with hunting, fishing, and gathering fruits and nuts. In the warmth of their arid environment the Hohokam could produce two crops a year—as long as they had enough water. Irrigation canals from rivers to the fields downstream were the answer.

Hohokam irrigation technology was impressively complex. Canals were dug with stone and wooden tools for a total of several hundred miles. Lateral ditches (not all were in use at the same time) spread water across a patchwork of fields.

Poles set along the canals supported water-control structures, possibly curtainlike fabric sheets. Adobe mud-lined porous areas, and deep pools retained fresh water when the flow in the canals dropped.

The main canals were built with just enough of a grade to flush out silt and keep it from accumulating.

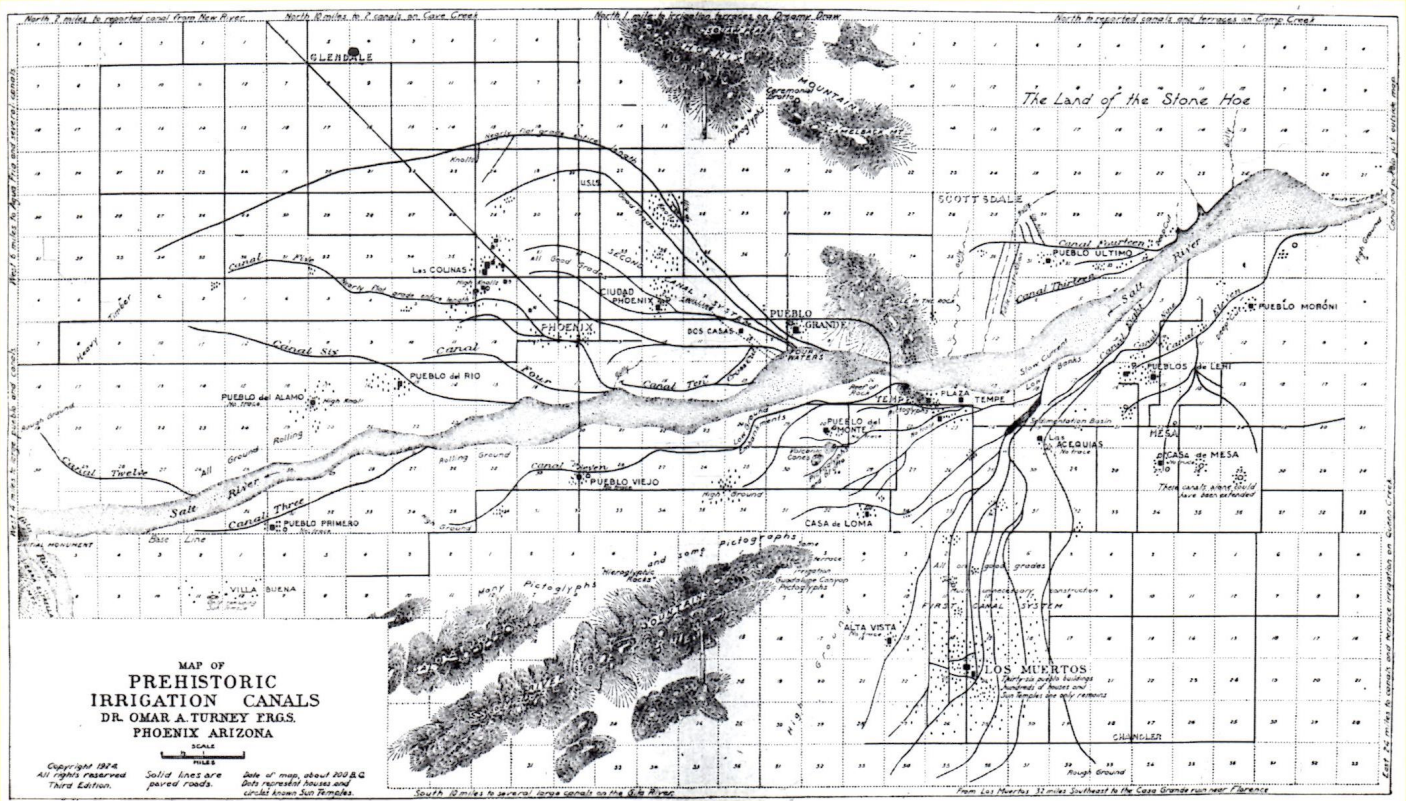
Hohokam canals developed over the years from a broad, shallow configuration into narrow ditches some

five to fifteen feet deep. This change reduced surface evaporation and ground absorption and enabled the canals to carry enormous amounts of water during heavy rainstorms—enough to allow even the cultivation of cotton. It has been estimated that at their peak the canals irrigated a total of 30,000 to 60,000 acres.



A Hohokam plate of uncertain date is decorated with a figure of a water carrier.

PRE-COLUMBIAN ENGINEERS



A 1924 map depicts, not entirely accurately, a group of ancient irrigation canals off the Salt River built by the Hohokam.

Hohokam villages were fairly simple affairs. Until about the fourteenth century, when they were influenced by the Pueblo culture of the north, the Hohokam lived in modified pit houses built from the brush and reeds lining the riverbank, held together with mud. While they built no multistoried great houses like those of the Anasazi until their final period, the Hohokam's success as irrigators and farmers provided food surpluses, which allowed them time to develop beautiful artifacts, including jewelry, incense burners, small clay and stone sculptures, jars with capacities of up to thirty gallons, and sea-

shells from the Gulf of California on which they etched designs with fermented cactus juice.

One other aspect of their life and ritual makes the Hohokam unique in the history of Southwestern cultures. Over four centuries starting in the late 700s, the Hohokam built more than two hundred ball courts. These oval arenas were dug into the ground; the largest is about the length of a football field. Their appearance provides a clear link to the Mesoamerican cultures from which the Hohokam originated. Thus far only one rubber ball has been discovered.

No definitive evidence exists to explain the apparent end of Hohokam culture around A.D. 1400. They may

have merged with the incoming Apaches for a while before becoming a distinct people again, this time known as the Pimas. Or they may have left the area entirely for unknown reasons.

One theory suggests that in the end the Hohokam's irrigation systems were too successful, as excessive watering of their fields made the soil too alkaline to grow crops. Other speculations include drought, war, flood, and plague. Not knowing the end of the Hohokam story, we are left with the picture painted by the ruins: the villages of unprotected thatch houses, the beautiful jewelry and ceremonial artifacts, the ball courts, and the miles of irrigation canals that still trace the once-flourishing fields.

—A.C.S.

of water to wash debris from mineral deposits, so they often diverted streams in their entirety. Little water continued downstream, and much of what did was polluted. The primacy of miners' rights over the traditions of Hispanic New Mexicans was ratified by a federal mining law of 1866, which allowed miners free access to public lands and declared that the old common river rights no longer applied.

Ranchers, too, were given access to great tracts of public land, often upstream of farming communities and their acequias. They gained the right to divert water into tanks for their stock and to dam rivers for ranching purposes. Ranchers and miners generally did not own the land; they leased it from the federal government. But they owned the land's water rights. The traditional link between land and water was broken. Farmers learned that owning fields near a river was no use if someone had already taken most of the river's flow.

Later years have brought further change. Resorts and condominiums have joined the mining corporations and ranchers in obscuring the old ways. In Taos County, for example, the expansion of the privately held Taos Ski Valley has resulted in the transfer by the state engineer of large numbers of priority water rights from the Arroyo Hondo to the ski valley for snow making. In 1982 a coalition of acequia associations using the Arroyo Hondo protested this policy. It lost. Agriculture is no longer considered the ultimate beneficial use of surface water in New Mexico.

Yet despite these enormous changes in the traditional way of life, the acequias remain remarkably intact. American laws have caused conflict, but they have also preserved and formalized the rights of acequia associations. A reduced level of small-scale agriculture continues in the valleys, and the acequias that support it are

official political subdivisions under the state government.

Each acequia today is supervised by three commissioners, who are elected annually by the *parciantes*. The commissioners hire one of the *parciantes* as a *mayordomo*, assess dues, and determine the *trabajo* (work) for which the *parciantes* are responsible. Traditions of community responsibility also appear in the acequias' bylaws; for example, commissioners can allow blind people or their surviving spouses to irrigate up to three acres free.

While the commissioners set policy and keep records, the *mayordomo* is the

verge on the *mayordomo*'s truck, which is always the first to arrive. The association secretary, who is one of the commissioners, also arrives early and stands next to the *mayordomo*'s truck holding a clipboard. The *mayordomo*, who is an old man, greets each arrival but never gets out of his truck. At seven o'clock precisely the secretary looks at his clipboard, and with the *mayordomo*'s permission he assigns the day and hours during which each *parciantes* may divert the flow from the acequia madre. The trucks begin leaving at seven-ten. By seven-fifteen the field is empty.



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boss of the ditch. He supervises the annual cleaning, assigns work to members and other laborers, and with the commissioners' permission, imposes fines and collects dues. (Dues vary from one to six dollars annually per irrigated acre; the dues on the Acequia Madre del Rio Lucero are five dollars.) Most important, the *mayordomo* also distributes the water.

During the growing season, which lasts from the start of winter runoff in May to the harvest in September, the *parciantes* of the Acequia Madre del Rio Lucero meet two evenings a week in an alfalfa-filled field. At six-forty-five on meeting nights, association members who need water pull their pickup trucks into the field, near where the ditch crosses the highway, and con-

Besides paying dues for using irrigation water, by tradition the *parciantes* must also labor in the ditch "in proportion to their quantity of tillable land." (The "proportional" part today mostly involves dues and fines, which are assessed per acre.) If *parciantes* cannot do the work themselves, they must provide or pay for replacement laborers. This work can include various small jobs over the season, but the most important work is the annual cleaning of the acequia.

One hundred and seventy-eight years after Spanish settlers dug the Acequia Madre del Rio Lucero, it has cut a channel four feet deep in some places and eight in others. Small waterfalls splash the flow from one section to another. In most places the ace-

Opposite: Users of an acequia participate in its upkeep. Right: The only concrete-lined section of the Acequia Madre del Rio Lucero.

quia seems more like a wild river than a canal. When you look across the fields near Arroyo Seco, you see a thick yet narrow growth of willow, wild rose, New Mexico olive, and cottonwood revealing the acequia's meandering path (trees grow best near the water's edge). Each long, narrow strip of private land is crossed with shallow depressions—individual ditches that carry away some of the acequia's flow. When they are filled with water on a sunny day, those shallow ditches gleam like liquid silver amid the alfalfa and tall grass.

Poverty and a strong sense of tradition have combined to keep the tech-

walls. *La limpia* may last a morning, a day, or several days, depending on the number of *parciantes* and the state of the acequia.

Using a long cottonwood staff, the *mayordomo* walks ahead, directing the *parciantes* behind him into the ditch to make repairs on a *tarea*, or section, whose length he determines. He points his staff toward the ditch and calls "Uno!" or "Dos!" and the first one or two *parciantes* on line climb down to clean that *tarea*. As they drop into the ditch, those behind move up. And so it goes in rotation: a *parciante* works up through the line, climbs into the

fail to irrigate it reduce the amount of water, labor, and dues available to the entire acequia. Many well-meaning outsiders who move to New Mexico to experience a traditional rural way of life unknowingly contribute to its demise by not participating in the system. The acequias may disappear.

Yet there are those who seek out New Mexico's northern counties and join the tradition rather than weaken it. In 1969 Stanley Crawford moved to a mountain village south of Taos. There he added garlic farming to his life as a writer and joined the local acequia association—an Anglo *parciante* from San Diego. By the 1980s Crawford had actually become the *mayordomo*. In 1988 he published *Mayordomo*, a book chronicling four seasons in the life of his community's acequia, and in 1992 he published *A Garlic Testament*.

Farming his one and a half acres of garlic, Crawford admits that "there are better ways to do all this"—methods of irrigation that are more efficient and productive, though more costly. And yet, says Crawford, two aspects of tradition matter.

"One has to do with the aesthetics. . . . I farm—a kind of painting on earth—because of the constantly changing patterns I can create with water, seed, soil, sunlight, and the weather," writes Crawford. "The other has to do with the social, with community, with human borders, with the acequia. . . . The water I take such pleasure in, in the furrow, in the acequia, in the river, is mine only in a transitory and heavily mediated way: it is delivered for my use, for my pleasure, through the labors of my thirty land-owning neighbors and the indirect consent of everybody else who irrigates in this small valley." Now completely committed to the tradition of community-run irrigation ditches, Crawford and others like him may represent that tradition's chance for survival. ★

Aurelia C. Scott is a freelance writer in Arroyo Seco, New Mexico, who maintains her garden with water from the Acequia Madre del Rio Lucero.



A head gate on the Acequia Madre del Rio Lucero. By taking the boards on top of the gate and inserting them into the stream, farmers can divert the water to a lateral canal.

nology of the acequias simple. Even today few of them have concrete ditches or permanent diversion dams. So the dirt-walled channels are cleaned annually, diversion dams are made with available scraps, and head gates are built of wood, rocks, and mud.

Following the roll call on the morning of *la limpia* (the cleaning), fifty of the more than two hundred dues-paying *parciantes* (the rest have paid a fine for being absent) follow the *mayordomo* to the edge of the acequia, dry now because the main head gate on the Rio Lucero has been closed for a week. The *parciantes* walk the length of the ditch from end to source, cutting brush, shifting rocks, removing logjams, digging out the winter's accumulation of loose dirt and slumped

ditch, then falls back to the end of the group to begin again. In the course of the ten miles each *parciante* will scramble into and out of the ditch at least forty times and will crawl through hundreds of barbed-wire fences. In between they monitor the changes in neighbors' fields and back yards and exchange family news.

In 1992 *la limpia* of the Acequia Madre del Rio Lucero included three Anglos. The Hispanic *parciantes* were glad to have them—Anglos who love the living history of acequias as much as they do. Newcomers who value the tradition of acequias are important. State law dictates that "water rights may be forfeited if the owner has failed to use the water for a period of four years." Thus those who buy land and