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IRVING KRICK, DALLAS RAINMAKER

by Marlene Bradford

Throughout the history of the southern Great Plains, the scarcity of rainfall has been a subject of great concern to its inhabitants. A 1943 dendrochronological, or tree-ring, study indicated that since 1539 the region had endured thirteen prolonged droughts.[1] Etched into the history of the area are the dust-bowl years of the late 1880s and the 1930s, but in spite of recurring dry spells, Texans failed to plan for future shortages. This neglect was all too apparent during the 1950s when several years of diminished rainfall brought the severest drought in Texas history.

Texas farmers and ranchers were accustomed to periodic droughts, but urban residents traditionally had remained unaffected. The 1950s were different, however. While stock raisers listened to the bleating of starving sheep and the bawling of thirsty cattle, city mothers endured pleadings of their children to play in the sprinkler or fill their wading pools, and neither could satisfy the cravings of their charges. Many towns had failed to keep up with the demand created by rapid growth and increased per capita consumption. Both large and small communities faced rationing or the emergency acquisition of water. Among metropolitan areas Dallas suffered the greatest hardship. Its experience represented what one authority considered the "classic example of the failure to anticipate drought in semi-arid lands."[2]

Located on the unpredictable Trinity River, the North Texas city of a half million people depended upon surface reservoirs for most of its water. In June 1950 construction began on a new municipal purification plant that would have doubled the supply upon completion, but when heavy earth-moving equipment was diverted to the Korean War effort, the project became a casualty. Dallas was forced to haul water from its dwindling reserves to newly annexed communities.[3] In 1951 when only 23.37 inches of rain fell, well below the yearly average of 32.14, Mayor R. L. Thornton appealed to citizens to conserve the precious natural resource. To curtail use the city increased the rates 20 percent.[4]

During the summer of 1952 Dallas reeled from record heat, and the first nine months of the year brought only 14.35 inches of rain. On October 16, Lake Dallas, the city's main reservoir, was at 11 percent of capacity, the lowest point in its twenty-five year history. According to the Army Corps of Engineers, the remaining twenty thousand acre-feet would last only four months. A two-month extension might be gained by using White Rock and Bachman lakes, but water from these sources could only be sterilized, not filtered, before it entered the mains. To meet the crisis a desperate city government pursued traditional means.[5]

Initially the city council enacted severe restrictions. Citizens could not water lawns, wash cars, or fill swimming pools, but curtailment of consumption was not sufficient. Additional sources of water were imperative. Engineers

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recommended the drilling of three deep wells at a cost of one hundred thousand dollars each, work that would take six months to complete. Council members then suggested tapping either Fort Worth's Eagle Mountain Lake or the Red River, but estimated costs for both projects were prohibitive.[6] The council finally proposed an emergency measure, construction of a small dam on the West Fork of the Trinity River, but public outcry against use of this sewage-polluted steam caused withdrawal of the plan. In the meantime, the clergy encouraged their flocks to seek God's help. Bishop Thomas Gorman ordered priests in the diocese to offer prayers for rain at mass and public services until further notice, and Catholic school children began their day with the same supplication. Rayburn Floyd, president of the Dallas Baptist Conference, invited all faiths to join in petitioning God for drought relief.[7]

Circumstances found these efforts wanting. The new month brought a disheartening report from the United States Weather Bureau. When only 0.05 inches of rain fell in October, Dallas was 13.45 inches below normal for the date, and the national long-range forecast called for subnormal precipitation in the Southwest during November.[8]

The grim outlook decreed another approach. Beset by dwindling water and funds, the Dallas city council instructed City Manager Elgin Crull to contract with Irving P. Krick's Water Resources Development Corporation (WRDC) of Denver, the country's largest commercial weather modification firm. Krick's methods were not untried in Texas. During 1951 and 1952 he had conducted seven cloud-seeding projects in the Panhandle, South Texas, and the Waco area.[9]

A graduate of the California Institute of Technology and chair of its department of meteorology from 1933 to 1948, Krick had gained fame through his long-range weather forecasting successes. Not only had he served as weather consultant for Western Airlines, Hollywood film makers, and the White House, but also during World War II he had been instrumental in determining appropriate dates for the North African and Normandy invasions, the Allied crossing of the Rhine, and bombing missions over Germany.[10]

After the war Krick and several members of Cal Tech's meteorology department further developed principles and methods for rain-enhancement based upon the work of Nobel Prize winning chemist Dr. Irving Langmuir and his assistant, Vincent Shaefer, and formed WRDC to handle commercial weather modification programs in the United States. Following experimental operations in California, Arizona, and Mexico in the late 1940s, the weather modification company's first clients were wheat farmers in the Horse Heaven Hills of eastern Washington where annual precipitation was about seven inches. In June 1950 Krick seeded two storms by spreading silver iodide particles from an airplane. Rains in excess of two inches fell on the area. Since the normal June rainfall was less than one-half inch, Krick claimed credit for a 430 percent increase. News of this apparent success spread rapidly across the country and initiated an expansion of cloud-seeding projects throughout the western United States. By June 1951 the area under contract to WRDC was more than three hundred million acres.[11]

Krick determined that the use of airplanes to spread silver iodide was too costly and the results too sporadic to be profitable. To replace aircraft, his company patented a ground-based generator, a steel box about the size of a floor-model television, which contained a tiny fire-brick furnace. Operators fed the fuel, foundry coke impregnated with silver iodide dissolved in acetone, into the crucible where it burned at twenty-five hundred degrees. A battery-operated fan blew air through the furnace to create an updraft and diffuse the minuscule particles into the prevailing wind. Moisture in the atmosphere would condense around the speck and eventually fall as raindrops. Crucial to the success of an operation were the location and operating times of the generators. When a locality contracted with WRDC, the technical staff searched weather records, estimated the number and types of storms that would pass over the area each month, and used the company's long-range forecasting services to select the most desirable dates for seeding. Technicians installed a network of generators at distances of fifty to two hundred miles from the target. In the Denver control center meteorologists constantly received current conditions and rainfall measurements from government weather service teletypes, radar observations, and conversations with operators in the field. When a storm formed, they determined its track, consulted large maps covered with multicolored tabs marking generator locations, and notified operators in the path to start the seeding. The operations manager for a particular area followed the storm on the ground with a mobile generator which he used if the clouds changed directions. The plan was to diffuse smoke crystals over the target area to induce the atmosphere to release as much moisture as possible.[12]

City Manager Crull warned that Krick's organization did not promise to make rain, only to increase the amount that would fall under natural conditions. This proposal, he concluded, was a case of "hell if we do and hell if we don't." Should the Dallas government not hire Krick, citizens would criticize it for not doing everything possible, and, if rains did come, some would say rain was bound to fall anyway.[13] The initial six-month cloud-seeding program, which cost $36,505, began on November 22. Arnold Janicek, Krick's meteorologist in charge of the Dallas project, stood ready to activate generators located in Texas at Seymour, Anson, Ranger, Valley Mills, Stonewall, Mexia, and Tyler and in Oklahoma at Durant and Rush Springs.

When citizens of Mount Pleasant, a small town some 125 miles east of Dallas, received showers in late November, they credited the rainmaker. They dropped dimes into a jar at the Alps Cafe and forwarded five dollars to the *Dallas Morning News* to help defray the cloud-seeding expense. Those who benefitted, they believed, should be willing to pay.[14]

During the initial contract period generators belched silver iodide into the North Texas skies for 871 hours on twenty-two different occasions. When Krick reported the results of the first six months' work to Crull and Water Superintendent Karl F. Hoefle, they were amazed at his figures. From January 1 to June 1, 1953, the water supply in Lake Dallas increased 363 percent. By contrast, Fort Worth's Lake Bridgeport rose 19 percent while its Eagle Mountain Lake experienced a 5 percent loss during the same period. Rainfall over most of

the Dallas watershed ranged from 110 to 135 percent above normal. Krick concluded that so great an increase in the Dallas reservoir compared with other area lakes could not be accidental. He suggested that Dallas would profit greatly from a five-year seeding program, especially if neighboring Fort Worth were included. Crull decided to postpone a decision on this option until fall, when weather conditions would be more favorable for seeding.[15]

By October 1953, the level of Lake Dallas had declined to a nine-month supply. In response the city council signed a second contract with Irving P. Krick, Inc., of Texas, a subsidiary of WRDC. This time the cost was fifty-two thousand dollars for one year, with the city to retain the right to cancel on thirty days' notice. As the project proceeded, nineteen generators operated for 1376 hours on forty-three different days. Results were not as dramatic as those of the previous operation, however. While Krick could report that seeded areas received seventeen to twenty-five inches more rainfall than surrounding parts of Texas, reservoir levels remained relatively stable. After discussions with Miss E. A. Finley, Krick's representative, on October 1, 1954, Crull announced that Dallas was not interested in renewing the contract because to date no increase in the city's water supply had occurred.[16]

Relief continued to withhold its blessing. During the first four months of 1955 the levels of Lakes Dallas and newly-built Garza-Little Elm decreased 35 percent, and the rising rainfall deficit stood at six inches. To compound difficulties, consumption had increased 31 percent from the same period in 1954. On May 15, at the urging of citizens and Mayor Thornton, the city council entered into a third contract with Krick. The terms were similar to the previous agreement. Dallas would pay fifty-two thousand dollars for one year of cloud-seeding, but had the option of extending coverage to three years at a 15 percent reduction.[17]

This time results were impressive. On May 18 the target area received rainfall amounts of from three to over seven inches. Paul Caubin, Krick's general manager, attributed 30 percent of the resulting captured runoff to the seeding.[18] During May and June, as 11.57 inches of rain fell on Dallas Love Field, hope grew that the drought was ending. On June 24, 1955, the Morning News published excerpts of a letter to Crull from Robert L. Krier, Krick's meteorologist on the Dallas project. The weather modification company representative reported that cloud-seeding was responsible for the large amount of rain.

The third contract period produced twenty-five inches of precipitation, or 20 percent more than surrounding unseeded localities received. On May 9, 1956, just days before the end of the agreement, Caubin addressed the White Rock Civitan Club and took credit for 50 percent of the runoff into Lake Dallas during the seeding periods. In the *Journal American Water Works Association* of October 1956, Krick lowered the figure slightly. He stated that sixteen good operational storms, defined as those that produced significant rise in lake levels, reflected a 40 percent increase in precipitation when the Dallas watershed was compared with adjacent drainage basins. If runoff from these storms were

212,950 acre-feet, cloud-seeding was responsible for 85,180 acre-feet (40 percent of the amount), or 27.7 billion gallons. Had Dallas obtained this water from wells, the cost would have been over two million dollars, as compared to the approximately one hundred thousand dollars spent for seeding.[19]

Although skeptical, the Dallas city council voted eight to one on May 14 to renew the agreement for a year. In a prepared statement Mayor Thornton said that the council realized that results of cloud-seeding could not be exactly determined, but that the public would justly criticize them if they did not use every available means to maintain the city's water supply. He explained that since the fee was paid from water department funds, additional taxes were not necessary. Renewal would cost thirty-five thousand dollars, twenty-one cents per meter connection per year. In conclusion, the mayor acknowledged the council's belief in God and prayer, but he was also sure that God expected elected officials to be resourceful in serving their constituents.[20]

Krick's firm installed forty-four additional generators which covered wide areas of Oklahoma and North and West Texas. However, Dallas derived little benefit from this fourth and final experiment with weather modification. Constituents who considered cloud-seeding either a sacrilege or a sham exerted pressure to terminate the agreement. On October 22, 1956, the council voted unanimously for cancellation at the end of November and promised those who crowded the chamber that they would take all reasonable measures to refill the reservoirs. They reasoned that they could not see any useful purpose in continuing seeding of clouds until more normal weather conditions returned. Mayor Thornton added that this conclusion followed the realization that the drought could persist and storms needed for seeding had not materialized in several months.[21]

Throughout Krick's association with Dallas his activities were a popular topic. *The Dallas Morning News* of July 7, 1956, featured the story of two Southern Methodist University professors who provoked much laughter at the weekly Lions Club luncheon at the Hotel Adolphus. Aware that Morton Winthrop and George Bevel from Krick's organization were scheduled to address the gathering, Dr. J.M. Claunch drew attention to his dusty umbrella and Dr. D. W. Starr was conspicuous in a raincoat. The speakers graciously participated in the gag, presented their remarks on cloud-seeding, and enjoyed the last laugh. As the luncheon crowd prepared to leave the hotel, they stepped back from the healthy rain that fell.

But not everyone viewed weather modification in a humorous light. Throughout the entire operation objections to Krick and his tampering with nature filled the editorial pages of the Morning News. One reader felt that if gratitude for rain were directed toward God, rather than Krick, the city would receive more precipitation.[22] Another stated that running a cloud-seeding generator was taking power out of God's hands,[23] while a third called God the "official rainmaker" who would give Dallas all the rain it needed if only the city would live according to His gospel.[24] An editorial on September 15, 1956, noted that a check of letters to the editor for the preceding few months showed

85 percent were against Krick and for prayer.

Some citizens objected to the cost. One Dallasite wondered why the city could pay fifty thousand dollars for an unsuccessful rainmaker and not afford better police protection.[25] Another suggested that the council might better purchase an "old-fashioned money-making machine,"[26] while a third reader complained that the eighty-five thousand dollars dedicated to a project that failed to produce rain should have been applied elsewhere.[27] Perhaps an article of November 16, 1956, best expressed the prevailing attitude when it called Krick the "most maligned and misunderstood man in modern Dallas time."

While public opinion appeared to run heavily against cloud-seeding, some citizens did offer praise. The pastor of the First Baptist Church of Ranger felt the earth was meant to be developed, and scientific production of rain was no worse than building a dam across a stream.[28] One reader expressed the opinion that "God helps those who help themselves," and Krick was only following that precept.[29] A concerned Dallas resident wanted to convert the old Dallas public library building into offices for Krick and give him a twenty-year contract,[30] and a San Antonio reader praised the contract and said the cost would be negligible in comparison with potential benefits.[31]

Throughout the four years of cloud-seeding in Dallas the *Morning News* supported the council's endeavor to overcome the water shortage. An editorial of May 18, 1955, considered the fifty-two thousand dollars a small price for filling the city's fifty-million dollar reservoirs. Furthermore, the council was justified in renewing the contract, even though results from previous agreements were not conclusive. A few weeks later the newspaper voiced the opinion that those who said Krick could not make it rain could not prove it, while the runoff received from seeding corroborated his work.[32]

NOTES

[1]Harry E. Weakly, "A Tree Ring Record of Precipitation in Western Nebraska," *Journal of Forestry* 41 (November 1943), p. 817.

[2]Thomas M. Hatfield, "Drought and Texas Cities," *West Texas Historical Association Year Book* 40 (October 1964), p. 46.

[3]*Dallas Morning News*, June 18, 1950.

[4]*Dallas Morning News*, August 12, 1951. Rainfall statistics have been calculated from data in James E. Ruffner and Frank E. Bair, eds., *Weather of U. S. Cities*, 2d ed., vol. 2 (Detroit, 1985), p. 1057.

[5]*Dallas Morning News*, October 17, 1952.

[6]The costs for the Red River tap were estimated at $500,000 to $600,000 and the Eagle Mountain Lake project at $750,000.

[7]*Dallas Morning News*, October 24, 1952; October 29, 1952.

[8]*Dallas Morning News*, November 1, 1952.

[9]In 1951 WRDC contracted with Border Livestock Association (South Texas), Brooks-Jim Hogg Counties, Coastal Bend Weather Improvement Association (Corpus Christi area), and Central Texas Rain Increasing Corporation (Waco area). In 1952 WRDC contracted with Texas-Oklahoma Weather Improvement Association (Panhandle area), West Texas Weather Improvement Association (South Plains-Permian Basin area), and Panhandle Weather Improvement Association.

[10]For Krick's early career see Victor Boesen's biography *Storm: Irving Krick vs. the U. S. Weather Bureaucracy* (New York, 1978), pp. 15-69.

[11]Irving P. Krick, "Increasing Water Resources Through Weather Modification," *Journal American Water Works Association* 45 (November 1953), pp. 998-999.

[12]Water Resources Development Corporation, *Why and How the Krick System of Cloudseeding Works* (Palm Springs, California, n.d.) pp. 2-3.

[13]*Dallas Morning News*, November 12, 1952.

[14]*Dallas Morning News*, November 29, 1952.

[15]Irving P. Krick, "Operations Report November 22, 1952-May 22, 1953 for City of Dallas" (Denver, 1953), pp. 2-5; American Institute of Aerological Research, "Report on Cloud Seeding Operations for the City of Dallas, Texas" (Denver, 1956), pp. 5-8. These reports are in the author's possession. In 1978 the offices of WRDC burned. The only reports salvaged were a few personal copies of seeding operations in Dallas which Dr. Krick graciously presented the author. Because Texas had no weather modification laws until 1967, no state records are available for the period under consideration.

[16]*Dallas Morning News*, October 2, 1954; American Institute of Aerological Research, "Operations Report for the City of Dallas, Texas" (Denver, 1955), pp. 2-5.

[17]*Dallas Morning News*, May 17, 1955.

[18]*Dallas Morning News*, June 4, 1955.

[19]*Dallas Morning News*, May 10, 1956; American Institute of Aerological Research, "Report on Cloud Seeding, 1956," pp. 5-8; Irving P. Krick, "Results of Cloud Seeding Operations to Augment Municipal Water Supplies," Journal American Water Works Association 48 (October 1956), pp. 1255-1257.

[20]*Dallas Morning News*, May 15, 1956.

[21]*Dallas Morning News*, October 23, 1956.

[22]*Dallas Morning News*, June 5, 1955.

[23]*Dallas Morning News*, December 7, 1952.

[24]*Dallas Morning News*, November 19, 1953.

[25]*Dallas Morning News*, October 18, 1953.

[26]*Dallas Morning News*, November 17, 1952.

[27]*Dallas Morning News*, May 20, 1955.

[28]*Dallas Morning News*, December 7, 1952.

[29]*Dallas Morning News*, September 13, 1956.

[30]*Dallas Morning News*, September 13, 1956.

[31]*Dallas Morning News*, October 13, 1953.

[32]*Dallas Morning News*, June 5, 1955.