

The thesis of Milford Wayne Donaldson is approved by:

UNIVERSITY OF SAN DIEGO

Charles Mallory Hatfield
Pluviculturist Extraordinaire


Steven E. Schoenherr, Ph.D.

A thesis submitted in partial satisfaction of the requirements for the degree of
Master of Arts in History

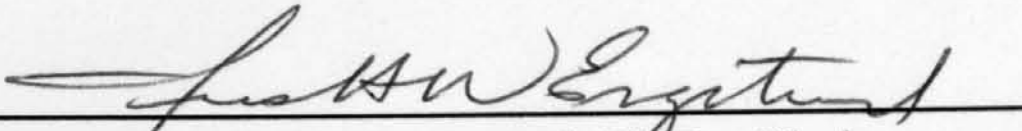
by
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Charles Mallory Hatfield

1908

Photo courtesy of David Hatfield Collection



*Ye gods of snow, of storm and shower,
Behind what Hatfield doth this hour;
His 'lectro chemic vapors rise,
To wet the world and ease the skies.¹*

CHAPTER ONE

INTRODUCTION

Full of bullet holes and marked with graffiti, a rock monument stands at a deserted highway turnoff to Morena Lake, high in Los Piños mountains in eastern San Diego County. Erected in 1973 by the Native Sons of the Golden West, the monument contained a bronze plaque that was stolen some time in the 1980s. The plaque simply read:

Hatfield the Rainmaker

In January, 1916, Charles M. Hatfield in Agreement with the City of San Diego for \$10,000 erected two platforms near Lake Morena releasing chemical vapors into the sky. Rain fell continuously for several days flooding the entire county. When Lower Otay Dam collapsed, a section of Sweetwater Dam was washed out. Damages into the millions resulted along with 15 lives lost. The city called the rain an "act of God" forcing Hatfield to flee the country minus his \$10,000.²

In the pages that follow, this thesis will show that Charles Mallory Hatfield changed the public's perception from the mythical rainmaking of the 1890s to the scientific investigation of weather modification in the 1940s.

The stories of Charles Hatfield and his rainmaking events continue to be lost in the romance of western folklore of semiarid southern California. Hatfield's

¹ From Philip Holloway, "Rain, Rain, Come Again," clipping, *Dawson Daily News*, 1906, Hatfield Scrapbook, vol. 1., Los Angeles Central Public Library.

² *San Diego Union*, January 6, 1973.

life is presented as a link to the 1890s midwestern rainmakers of Kansas, Nebraska and the Dakotas. He is portrayed in literature as belonging to a group of quack purveyors, known as "pluviculturists," selling their rainmaking schemes amidst fanfare and drama.³ Throughout his life, Charles Hatfield was the recipient of negative and degrading remarks from the scientific community, branding him as a faker and pseudo-scientist. The U.S. Weather Bureau for over twenty years, attempted to discredit Hatfield, claiming that all the rain he "created" was predictable and people were fools to contribute money to his confidence game. Hatfield was also called "the first popular folk-hero" of the semiarid part of California, and stories about him came to rival those of Pecos Bill and Paul Bunyan.⁴

This thesis will show that Charles Hatfield was an illustrious exception to his midwestern rainmaking counterparts, as he steadily refused to be called a "rainmaker." Within the transitory period from the 1890s to the 1930s, Charles Hatfield, self-taught and self-assured, instilled confidence in local farmers and ranchers as he consistently produced successful rainmaking demonstrations. With the long droughts in semiarid communities, Charles Hatfield gave hope to local farmers and ranchers prior to the introduction of irrigation where water could be purchased at a reasonable cost. Hatfield's wooden towers, "no rain, no pay"

³ William J. Humphreys, *Rain-Making and Other Weather Vagaries*. (Baltimore: William & Watkins Co., 1926), vii. A natural-born skeptic, David Starr Jordan, former chancellor of Stanford University, invented the word "pluviculture" in 1925 to describe "the growing and marketing of rain-making schemes." Like astrology and palmistry, Jordan's pluviculture was a branch of "sciosophy," as he called it; it stood in the "shadow of wisdom" and was the special domain of the sharp "quacktitioner."

⁴ Carey McWilliams, *Southern California Country*. (New York: Duell, Sloan & Pearce, 1946), 196-199.

guarantee and his mysterious chemical formulas and evaporating pans became recognizable trademarks of his methods. Charles Hatfield, along with his brothers Paul and Joel, continued their "moisture-enhancing" practice for over forty years, experimenting constantly to perfect their system, many times without compensation. Charles Hatfield spanned a generation of successful rainmaking demonstrations, documented in his personal correspondence with clients and interviews in the popular press. Hatfield was the most famous rainmaker working the semiarid regions of southern California, but his rainmaking business evaporated with the introduction of low-cost and dependable irrigated water to the region.

The notions of controlling the weather are as old as mankind and continue to intrigue mere mortals. Ancient and primitive societies all had their methods to try to control the weather, especially rain and wind. The ancient Greeks solicited rain from Zeus by prayer and sacrifice. Roman women in bare feet and streaming hair implored showers from the great Jupiter. The magician of the Nara tribe of northern Australia conjured rain by taking water into his mouth and squirting it out all around. In portions of Wallchia, Africa, the women and girls go naked by night to the edge of their village, carrying vessels of water they empty onto the ground. Arabs of north Africa fling a holy man into a spring. Women of Kursk, a province of southern Russia, throw a passing stranger into a river. The Duri tribe of Australia drip blood from the legs of two lizards on the bodies of men of the tribe and cover them with bird feathers to represent clouds. The Iroquois burned tobacco and the Omahas sprayed water into the air from their mouths. Fire was

sometimes used to stop rain in New South Wales. The Thompson Indians of British Columbia attempted to stop rain by pointing a fire stick toward the sky and addressed the rain as follows: "Now then, you must stop raining; the people are miserable. Ye mountains, become clear."⁵

Caught between the mythology and superstition of the 1890s rainmaking schemes and the successful experiments of weather modification of the 1940s, Hatfield's methods transcended public ridicule to become a precursor of the future scientific endeavors of rainmaking. The San Diego flood of 1916, halfway through Hatfield's career, led to the nation's first recorded lawsuit regarding damage caused by weather modification. In later years, similar rainmaking disasters would occur leading to an eventual legal framework to license rainmakers and control their methods.

Both American science in general, and meteorology in particular, were in flux at the opening of the nineteenth century. Meteorology was called "an interesting example of a field in transition from folklore to science" during the fifty years following 1800.⁶ By the 1840s the study of weather and the atmosphere became a major scientific concern; research on heat would soon give birth to thermodynamics which would contribute much to meteorology. As the century progressed, the scientific revolution in America tore technological knowledge loose from its traditional mythical moorings and anchored it firmly to

⁵ Humphreys, 6-28. William Jackson Humphreys, 1862-1949, gives a good account of the ancient and primitive methods of magical and religious rainmaking. Also see James George Frazer, *The Worship of Nature*. (London: Macmillan & Co., 1926).

⁶ Charles Singer, *From Magic to Science: Essays on the Scientific Twilight*. (New York: Dover, 1958), 7.

science---a science which gradually became more specialized, professionalized and institutionalized.⁷ Although historians would not necessarily agree that nineteenth-century American scientists were indifferent to basic science, the entrepreneurial climate of the era was clearly more conducive to practical applications, with a growing appreciation by the public of the role played by science and technology in the "march of progress." The purpose of basic research was not easily understood by the common man in the mid-1800s.⁸

Although David Starr Jordan's "pluviculture" was set against the unfolding science, it also was cast against the "Golden Age of Quackery."⁹ Jordan was speaking of a new breed of rainmaker, one who fit this new transitional world, one who relied less on magic or religious faith and more on practical psychology, science or pseudoscience and everyman's confidence in the brave new technical world that was nineteenth- and twentieth-century America. By the 1890s the country had experienced the gamut of rainmaking proposals, from the absurd to the plausible, from the nonsensical to the scientific and from

⁷ "Science and Technology in Popular Culture," in *Science and Culture*, ed. Gerald Holton (Boston: Houghton Mifflin, 1965), 190-191.

⁸ Nathan Reingold, "American Indifference to Basic Research: A Reappraisal," in *Nineteenth-Century American Science: A Reappraisal*, ed. George H. Daniels (Evanston: Northwestern University Press, 1972), 38-62.

⁹ Stewart H. Holbrook, *The Golden Age of Quackery*. (New York: Macmillan Co., 1959), 25-27. The late nineteenth century was the heyday of patent medicines, for man or for beast. Snake oils, pain-killers and elixirs of life cured every ailment, from cholera to piles, scrofula to catarrh. In this era of "pipe-and-wire therapy," special vacuum or electrical galvanic gadgets relieved a range of disorders, from falling hair to neuralgia and male loss of vigor. Fancy medicine shows toured the land, beating the drums for "sure fire" health combinations: Doc Bevan and his pine pinon cough cure; Doc Hammon and his tapeworm remedy; Healy and Bigalow's Kickapoo Indian shows and their line of native oils, syrups and panaceas. "Quackery" is derived from the word quakeslaver, an archaic Dutch word relating to a person that pretends to have medical expertise.

the innocent to the criminally fraudulent. In all too many cases, the lines blurred between self-delusion, ignorance and exploitation of the drought mentality.

Americans, both urban and rural, were victims of "scientific quackery" along with other remedies, but farmers were especially susceptible. In American agriculture in the late 1800s early 1900s folklore and superstition persisted. Thrown into the new and impersonal world of trade and industry, farmers appeared over-receptive to innovation and vulnerable to humbuggery of all types. Traditionally, throughout the nineteenth century, the flimflam artist went out of his way to "harvest the American farmer."¹⁰ The creation of rain in semiarid areas of the western frontier became the calling of a new breed of rainmaker at the turn of the century.

Charles Hatfield, against these social and technological scenarios, fit well in this transitional world of magic and science. Hatfield relied on self-taught methods of meteorology, the detailed study of historical climatic conditions and chemical experiments based upon available scientific data. Jordan's "pluviculture" also involved the dreams of common folk, usually rural, struggling against the environment. "Pluviculture" pits amateurs against the "scientific professionals" with the meteorological fraternity firmly in opposition to all rainmakers. As one meteorologist said in 1921 "talking to a meteorologist about

¹⁰ Quoted in Earle W. Hayter, *The Troubled Farmer, 1850-1900* (DeKalb: Northern Illinois University Press, 1968), 170. "Slick 'plug hat fellows' descended like locusts, hawking patented beehives, incubators, or new illuminating oils. Lightning rod salesmen became both common and stereotyped. The ubiquitous seed huckster and the tree peddler, with a 'tongue as long as your arm, as oily as a piece of bacon, and as loose as a calf's tail in fly-time,' promised watermelons big as bushel baskets and fantastic yields from exotic Hungarian corn or Bohemian oats."

Figure 2

The New Commercial Industry, ca. 1891.

First Drummer - "I am representing the Thunderbolt Rain-Producing Company - our showers last two hours and twenty minutes, and we make a sample shower free of charge!"

Second Drummer - "Let me take your order, sire, for the Aquarius Artificial Rain-Making Company - our rain is superior to anything in the market, and we give a silk umbrella and a pair of overshoes with every shower!"

From *Puck*, September 9, 1891. Courtesy of the Kansas State Historical Society, Topeka, Kansas.



rain-making is about on par with discussing Mother Goose with Professor Einstein. It is not ordinarily done.”¹¹ Charles Hatfield was the exception. Hatfield focused on the scientific analysis in the new field of meteorology and weather forecasting, constantly discounting magic and folklore regarding his demonstrations as a means to produce rain.

In 1946 General Electric scientist Vincent J. Schaefer flew over a cloud, scattered three pounds of dry ice, and watched it rain. Schaefer was the brilliant laboratory assistant of Nobel Laureate Irving Langmuir. The two inaugurated a new era by scientifically proving the feasibility of man-made rain by seeding supercooled clouds.¹² Meteorologists accepted the idea only grudgingly, but by the 1960s and 1970s there was no doubt that some degree of success was a reality.

Prior to 1946 most weather modification schemes were classified in four categories.¹³ The first category of weather modification was the upward convection of warm, moist air, through the use of ground fires; second, the “boom-boom” approach that theorized explosions in the air would blow rainfall out of the sky; and third, with the airplane came the “salt-shaking school,”

¹¹ *San Diego Union*, June 5, 1921.

¹² *Proceedings of the First National Conference on Weather Modification by the American Meteorological Society*, State University of New York at Albany, April 28-May 1, 1968, I.

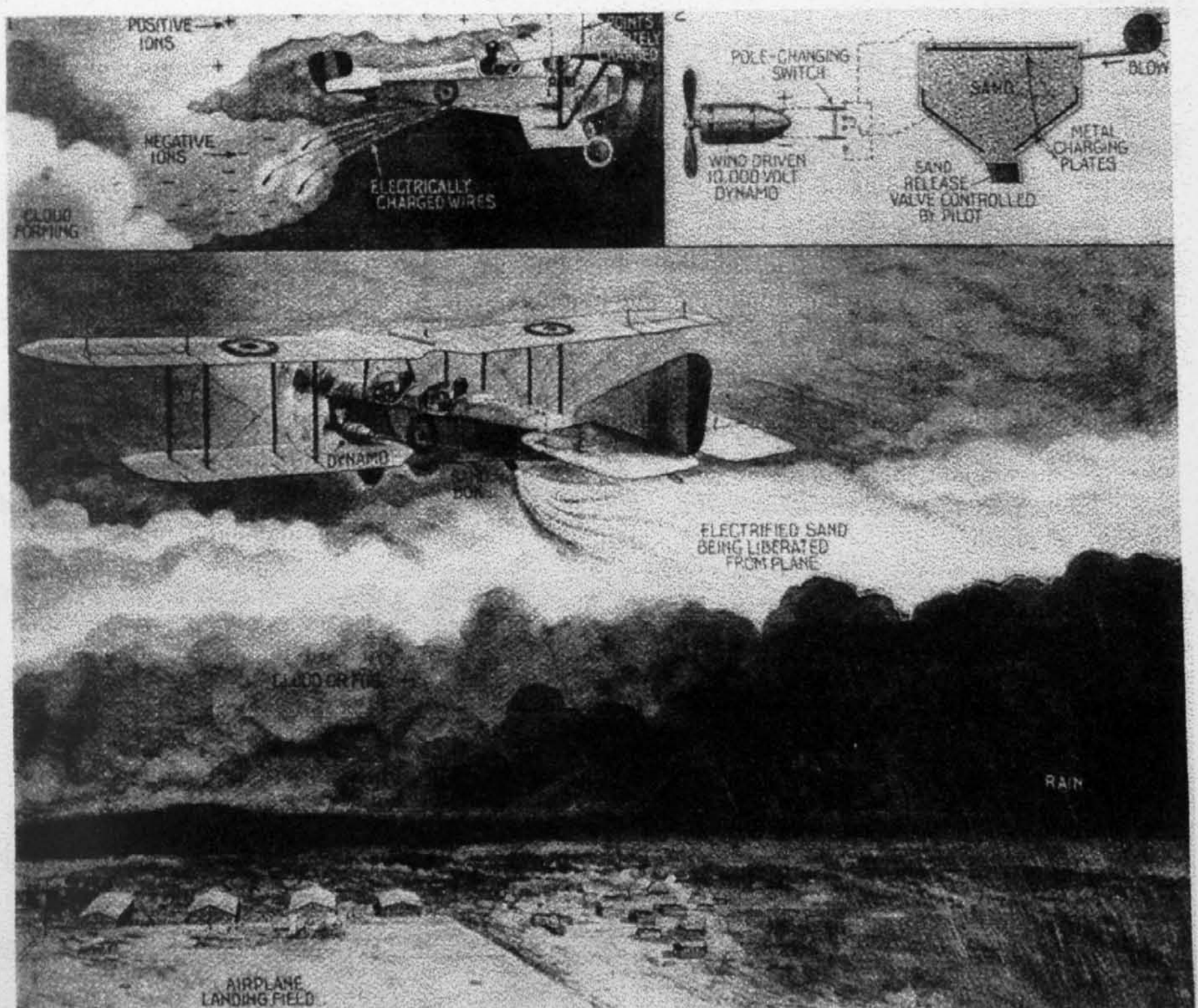
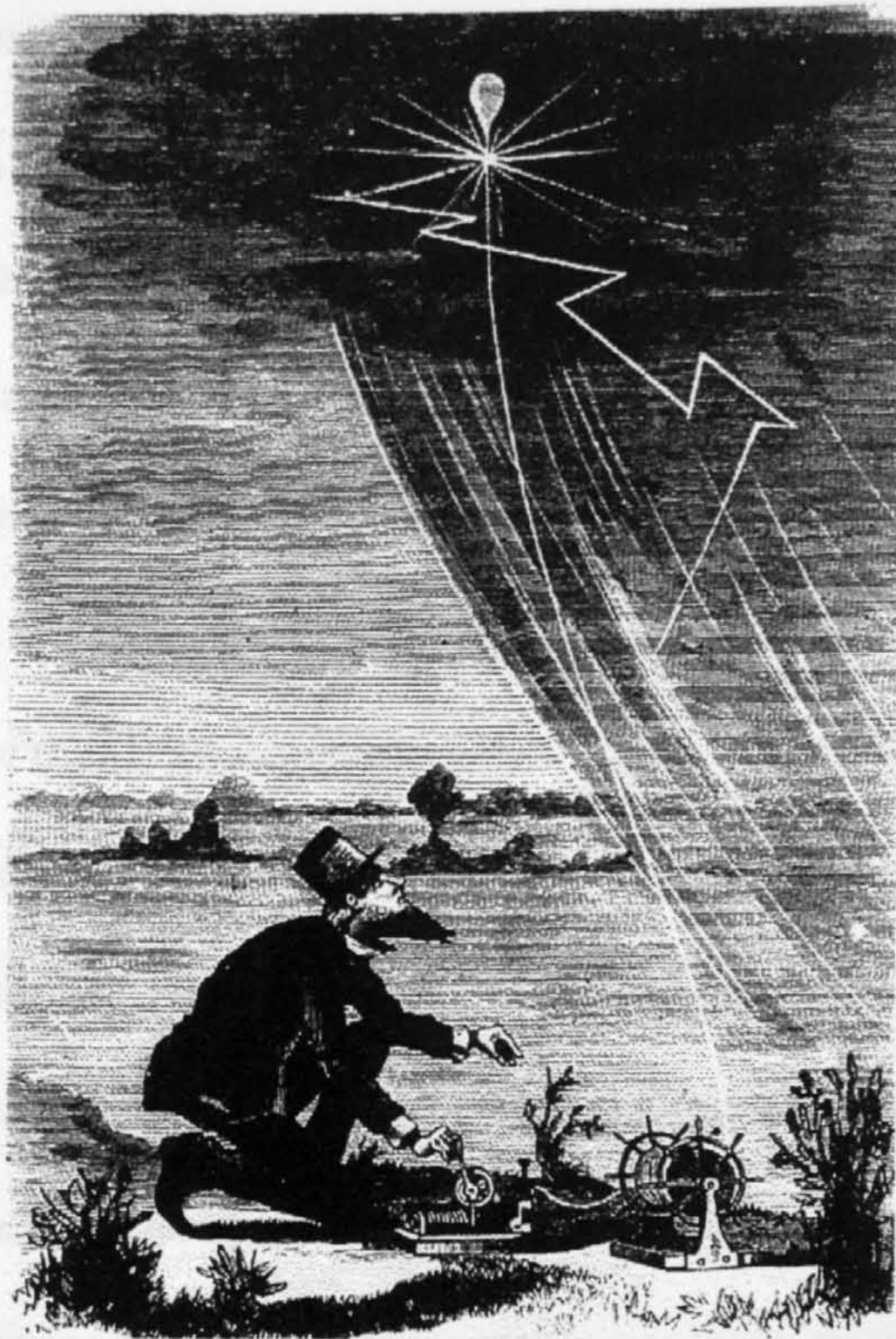
¹³ Clark C. Spence, *The Rainmakers*. (Lincoln: University of Nebraska Press, 1980), 5. Several impractical pipe dream schemes fell far beyond the realm of practical applications. One man, for example, proposed destroying blizzards with a line of coal stoves along the northern boundary from the Red River to the Continental Divide. Another advocated a number of large concave glasses set on platforms along oceans or rivers to focus the sun's rays and draw up water vapor, which would then cool and condense. One person even believed that “the intense vibrations of modern life completely abridge and render inert the natural vibrations and concussions that occur in nature and which are vital to production of rain and seasonable climate.”

Figure 3

Rainmaking Using Explosives, ca. 1880.
From *Scientific American*, November 27, 1880. Sketch showing the use of balloons with explosives, set off by an electrical current. Courtesy of the Kansas State Historical Society, Topeka, Kansas.

Figure 4

Rainmaking Using Electrified Sand, ca. 1920.
Making Rain with Electrified Sand. Courtesy of the Cornell University Archives. From Clark C. Spence, *The Rainmakers*. Lincoln: University of Nebraska Press, 1980.



rainmakers who sowed the clouds with chemicals, electrified sand or other elements. Hatfield, however, followed the fourth and most common category, that of the "smell-makers." These rainmakers performed their work by releasing a chemical, or combination of chemicals, into the atmosphere.

From the late 1800s to the early 1900s, encouraged by aggressive literature of the railroads and a western states sales campaign, land-hungry farmers moved out to the prairies of the Great American West. Many went to Kansas, Nebraska and the Dakotas and were convinced that the agrarian visions of the Jeffersonians could be fulfilled and began the task of farming these great arid central areas. The settlers also came to the semiarid region of southern California prior to the construction of an affordable irrigation system and during periods of extreme drought. As the farmers and eventually governments hung on in hopes of prospering, they were willing to listen to any scheme that might bring water.

The literary sources on rainmakers and rainmaking activities are vast and scattered. The sources continue to promote the notion that the rainmaker, including Hatfield, was a confidence man, a fake and a person of unscrupulous character. The sources discount the rainmakers and make no attempt to correlate their activities with the scientific development and research of weather modification. The following eight major sources are considered to be authoritative on rainmakers from 1890 to 1930 during the "Age of Pluviculture."

Alexander McAdie, Professor of Meteorology, Harvard University and former Professor of Meteorology, U.S. Weather Bureau, wrote two books on weather manipulation and forecasting. In his first book in 1923, *A Cloud Atlas*,

McAdie discredits all artificial means of rainmaking and emphasizes that the science of meteorology is misunderstood by the rainmakers. While describing the rainmakers activities in detail but not mentioning them by name, McAdie concludes with:

Rain makers who have thus far received publicity by press notices have not, as a matter of fact, succeeded in making rain. Their claims have never stood investigation by competent and impartial judges. Indeed, there has been considerable misrepresentation and not a little imposition on a gullible public.¹⁴

McAdie's second book, *Man and Weather*, published in 1926, was a collection of his essays as delivered in the Lowell Institute Meteorology Course at Harvard in 1924. He notes the coming science of Anemography, the "description of the atmosphere," in order to "have a command of the air." McAdie emphasized the knowledge of weather for the strategic command of campaigns during war and for the production of agriculture. The book does not mention by name the rainmakers of the late 1800s or early 1900s but suggests that "when scientists have acquired a thorough understanding of the physical process of natures, weather will be man's servant rather than his master." In his book, McAdie confidently predicts three laws governing seasonal rain in central and southern California using meteorological terminology.¹⁵ Hatfield worked primarily in

¹⁴ Alexander McAdie, *A Cloud Atlas*. (Chicago: Rand McNally & Company, 1923), 57. McAdie was also a Lieutenant-Commander and Senior Aërographic Officer pilot with the United States Navy. McAdie was 12 years older than Charles Hatfield.

¹⁵ Alexander McAdie, *Man and Weather*. (Cambridge: Harvard University Press, 1926), 97.

"We may confidently predicate three laws governing seasonal rain in California:

- I. When the continental hyperbar is displaced to the northwest, the general drift of surface air being from the northeast, the winter will be dry.

(continued...)

central and southern California with his "rain-enhancing" apparatus. Alexander McAdie was a constant outspoken critic of Hatfield's demonstrations for over twenty years.

W.J. Humphreys, a meteorological physicist, published a book in 1926, *Rain Making and Other Weather Vagaries* in which he denounces the magico-religious and religious attempts to produce rain. He stresses the scientific analysis method and appears to be strongly influenced by Dr. David Starr Jordan's "pluviculture" attitudes. Throughout the book, Humphrey emphasizes his opinions using scientific formulas and the fundamental laws of physics and thermodynamics. There is a chapter on early rainmaking attempts that notes the "usual suspects" such as Robert Dyrenforth, C.W. Post, James Espy and Edward Powers, but no mention of Hatfield. Humphrey continues to discount, by way of chemical analysis, every ingredient known to be used by the "smell-makers," including zinc, sulphuric acid, calcium chloride, calcium oxide (quicklime), and sodium nitrate. Humphreys concludes with:

Perhaps the word 'chemicals' sounds mysterious to some people and for that reason is used by the rainmaking fraud and humbug.¹⁶

Charles Robert Kutzleb, in 1968, fulfilled his Ph.D. requirements at the

¹⁵(...continued)

- II. When the Aleutian infrabar is displaced southward, there is an accelerated flow of southerly surface winds with frequent and heavy rains and much snow in the Sierras.
- III. A dry period in winter in central and southern California is due primarily to a retrogression of the Aleutian infra bar. The winds blow parallel to the coast and are moving from colder to warm regions. There is no uplift as in the case of southwest winds which have traveled a long distance over comparatively warm water and therefore carry a load of approximately 22 grams of water vapor per cubic meter."

¹⁶ Humphreys, 39-40.

University of Colorado with his thesis "Rain Follows the Plow: The History of an Idea." Kutzleb emphasizes that the western movement immigration was promoted by the railroad and immigration bureaus anxious to settle the west, either on railroad or government owned land. The Great Plains, a desert wilderness without water, was always doomed for settlement regardless of irrigation or the magic of rainmaking. Promoted by the U.S. Weather Bureau, the concept "rain follows the plow" contends that once land is planted and crops grow, the rainfall will automatically increase due to vegetation. This concept, although erroneous, was widely accepted by the farmer. Kutzleb discusses several rainmaking events and rainmakers throughout the western settlement of the Great Plains. The settlement of California and therefore Hatfield, is not mentioned. Kutzleb concludes that rainmaking was all but dead by the mid 1890s, having been discredited by easily demonstrated failures and summarizes with:

The possibilities of artificial rain were strongly doubted from the first and the rainmaker's failure was easily demonstrated. Yet in a difficult form, that of rainmaking, the idea that rainfall on the Great Plains could be increased survived until it was discredited in the mid nineties. After 1894, widespread interest in artificial rainfall was not again manifest.¹⁷

D.S. Halacy's *The Weather Changers*, published in 1968, devotes one paragraph to Charles Hatfield. Not only did Halacy have Hatfield's name incorrect "Charles *Warren* Hatfield," but he also declared that Hatfield "roamed the country for a decade." Hatfield very seldom left California, although his exploits were reported world-wide. The great San Diego flood of 1916 was noted

¹⁷ Robert Charles Kutzleb, "Rain Follows the Plow: The History of an Idea." (University of Colorado, 1968), 39, 255, 292.

as creating the first national lawsuit regarding rainmaking contracts not being honored. Halacy's work is valuable, however, in that it was published two decades after Schaefer's and Langmuir's dramatic pioneering attempts at cloud seeding in 1946 and traces the legal action associated with weather control.

Halacy concludes his book:

There is always the chance that serendipity will come to the fore again as it did for [Vincent] Schaefer in 1946 and that a deceptively simple and highly effective method will supplant current methods. For better or for worse, man is changing it [the weather], just as he set out to many centuries ago.¹⁸

Thomas Patterson's "Hatfield the Rainmaker" story as published in the *Journal of San Diego History* in 1970 focuses on the 1916 flood and a subsequent lawsuit by Charles Hatfield for non-payment of services by the City of San Diego.

The story contains one of the best accounts of the damage caused by the 1916 San Diego flood "through the eyes of three witnesses." The story has a romantic flair as Patterson places an exaggerated connection of Hatfield's relations to San Diego noting "he [Hatfield] never was far in heart from San Diego." Several comments are incorrect relating to Hatfield's early life and his association with New Town San Diego. Patterson, a newspaper reporter, had the opportunity to interview Paul Hatfield, Charles' brother, when Paul was 83 years old, five years before Paul's death in May 1975, but speaks very little of Paul in the story.

Patterson treats "Charley" as a personal friend, describes him as "scrupulous, becoming of a gentleman and Quaker." He felt Charley "sold a product in an

¹⁸ D.S. Halacy, Jr., *The Weather Changers*. (New York: Harper & Row Publishers, 1968), 236.

honest way, with a sense of righteousness."¹⁹ Patterson begins his article:

Nobody ever got behind his [Hatfield's] mask and, in fact it may never have been a mask. The actual record of Hatfield's activities explodes some commonly held truths, but the strangest facts and coincidences persist. The record makes no real headway against the legend.²⁰

Paul Dee Travis' 1975 Ph.D. dissertation at the University of Oklahoma, "Charlatans, Sharpers and Climatology: The Symbolism and Mythology of Late Nineteenth Century Expansion in Kansas," discusses that the notion of creating rain artificially was neither new nor unique to the 1890s. "Rather," Travis notes, "rainmaking involved an extension of a complex set of time-honored agricultural myths frequently based upon the concept that Providence held the yeoman in special esteem." His dissertation emphasizes man's relationship to nature and ties his work strongly to Jeffersonian ideas and that the farmer possessed the God-given power to alter the climate to correspond with his specific agricultural needs. Travis serves up the traditional mythical rainmaking stories and focuses on rainmakers in Kansas, eventually concluding they were only charlatans taking advantage of the farmer. As Travis summarizes:

Many Kansas farmers, therefore, accepted the mythical rainmaker who promised to beckon precipitation from the clouds and who became a charismatic and cosmic miracle worker. With his mystical machinations and drawing from a tradition which stressed that man could control the elements as agricultural needs so dictated, the rainmaker worked his magic--but to no avail.²¹

¹⁹ Thomas W. Patterson, "Hatfield The Rainmaker," *Journal of San Diego History* 16. (Winter 1970), 3, 9, 26, 27.

²⁰ D.S. Halacy, Jr., 68-69.

²¹ Paul Dee Travis, "Charlatans, Sharpers, and Climatology: The Symbolism and Mythology of Late Nineteenth Century Expansionism in Kansas." (University of Oklahoma, 1975), 2, 3, 82, 130, 160, 161.

Clark C. Spence, professor at the University of Nebraska, produced an intriguing book, *The Rainmakers*, in 1980. Spence's well researched book on rainmakers of all sorts (including "Charles M. Hatfield, Miracle Man") summarized that the rainmakers "seem to have belonged more to the world of folklore and of mysticism than to science itself. Meteorology and knowledge of cloud physics progressed independently and slowly...only in the mid-twentieth century would they reach a point where theory and technique came together to produce artificial rainmaking...that could be considered useful." Spence contends that the real scientific discovery of rainmaking began with Vincent Shaefer's 1946 experiment and that other rainmakers "were bereft of scientific background or inclination." He continues "They [the rainmakers] were skilled, assured theatricals and pitchmen who, without the restraints of conventional morality, enjoyed not only their gains but also the sense of power and cleverness that came with their success." Spence concludes his chapter on Hatfield with:

Was Hatfield merely a con man, a gambler who, like the racetrack tout-is remembered only when he was right and forgotten when he failed? Of course he was the latter and more...Hatfield made a great show of protecting his secrecy with shotguns and revolvers...along with a great deal of self-deception, coupled with glib talk, fanfare, and splendid publicity made him a professional.²²

This thesis will uncover the contributions of Charles Hatfield to the science and legal framework of weather modification and dispel the myths that he was a charlatan taking advantage of desperate local farmers and ranchers prior to the introduction of low-cost irrigation water to southern California.

²² Spence, 99, 132, 133, 137, 138.

*It has drizzled and sprinkled and rained and poured.
The lightnings have flashed and the thunders have roared.
I've been crossing the streets on a pole or a board,
And wading around like a pup.
You've earned your money, you've done your work well.
Of your rain-making history surely will tell,
So now, if you really love us all well,
Mr. Hatfield-do-let-up.¹*

CHAPTER FOUR

HATFIELD, THE RAINMAKER

Through its control of public lands, the United States government has shaped, directed and controlled the development of many states, especially in the semiarid region. Farmers and ranchers in the west wanted to transfer land within their control and the United Land Act of 1877 was enacted to aid in bringing semiarid lands into use by allowing parcels as large as 640 acres (approximately one mile by one mile) to be sold for a small price.²

The practice of "land reclamation" in California came into direct conflict with the age-old concept of "riparian rights" to water, which held that water diverted from a stream for non-domestic use must be returned to that stream undiminished. For the early hydraulic mining operations, the law was impractical, so California revised the law with the doctrine of "appropriate and beneficial use."³ Hydraulic mining was an industry on a large scale and was enormously

¹ Clipping, *Los Angeles Examiner*, n.d., Hatfield Collection.

² Lawrence B. Lee, *Reclaiming the American West*. (Santa Barbara, California: Clio Press, Ltd., 1980), 4.

³ Robert H. Boyle, John Graves and T.H. Watkins, *The Water Hustlers*. (New York: Charles Curtis Inc., 1973), 140.

destructive. In the Sacramento region the mining operations dumped so much debris on the river plains it raised the stream beds and greatly increased the perennial danger of flood. In 1884, as a result of the valley's farmers and the California state legislature requiring the industry to hold its muck, the enterprise of hydraulic mining was terminated. This move was the single most important event that led to agriculture as the largest industry in the state.⁴ In 1887 the state legislature passed the Wright Act, a law that permitted regions to form and bond irrigation districts.⁵ Irrigation Districts were being formed in the early 1890s with emphasis being placed on the southern California area.

The construction of the Sweetwater Dam in 1888 by the Southern California Railroad, a subsidiary of the Santa Fe Railroad, resulted in an ambitious undertaking to provide water to the San Diego area. Although the dam was capable of holding six billion gallons of water, the capacity of the reservoir was only sufficient to hold a two years' supply to irrigate ten thousand acres. The construction of the San Diego Flume in 1889 was another massive undertaking, consisting of fifty-five miles of wooden flume through mountainous country beginning in the Cuyamaca Mountains. Water was sold at "the law rate" of \$300 per inch.⁶ By 1893, four irrigation districts were formed under the Wright Act in

⁴ Ibid, 142.

⁵ State of California, Department of Engineering, *Bulletin No. 2, Irrigation Districts in California 1887-1915*. (Sacramento: California State Printing Office, 1916), 8.

⁶ International Irrigation Congress, *Irrigation in Southern California, Los Angeles, California, October 10-15, 1893*. Papers published by the Publication Committee of the Congress, Los Angeles Printing Company, July 1893, 38-42. The flume, completed in 1889, was touted as an engineering marvel. The flume contained 325 trestles with one trestle 1,664 feet long and seventy feet high. Nine tunnels aggregate a mile in length. The
(continued...)

San Diego County: Escondido, Fallbrook, Linda Vista, and Jamacha. Prompted by the droughts, cities in southern California were desperately looking for ways to water the land.

The first International Irrigation Congress was held in Los Angeles on October 10-15, 1893 at which leading representatives of the United States, Europe, Asia and Australia met to discuss irrigation methods, laws, and securities. The event was highly promoted by the Committee on Irrigation and Reclamation of Arid Lands of the United States Senate. In the 1890 census, less than nine percent of potential agricultural lands in California were irrigated. The average cost of irrigating an acre of land in California was \$150 per inch compared to a national average of \$83.28 per inch. The Congress reported on the success of irrigated land in southern California:

In southern California, lands that were worth from fifty cents to five dollars per acre, since irrigated, sell from \$300 to \$1,000 per acre and more. The farmer in an irrigated region does not have to wait for rain in order to plow, to sow, or to cultivate. He has the elements and the seasons practically under his control. Irrigation is an art that must be learned. It has been brought to the highest perfection in southern California.⁷

The motto of the Congress was "Irrigation and Science, Not Chance."

The Hatfields came to Los Angeles in the spring of 1890 at the end of the economic "Boom of the Eighties." The farms in the valleys near Los Angeles

⁶(...continued)

six-foot-wide flume cost \$1,500,000 was built by the San Diego Flume Company. "\$300 per inch" refers to a volume of water one inch high and covering one acre. This price was considered to be extremely high and only available to large land owners in limited quantities.

⁷ Ibid, 7, 8, 47, 48. In 1890 the City of Los Angeles had a population of 65,000 and San Diego 16,159. In 1880 Los Angeles had a population of 12,000 and San Diego 2,600.

periodically suffered from droughts and Stephen Hatfield complained about the lack of rain for growing barley and hay crops and decided to become involved in real estate and building.⁸ In 1893, the family moved to Pasadena, Charles Hatfield finished his formal schooling and went to work as a sewing machine salesman for the next ten years.⁹ During the mid-1890s, Charles Hatfield became aware of his family's suffering due to the lack of rain and during this time, he apparently became interested in rainmaking.

With the southern California area in drought, the City of Los Angeles was nervously wondering if the Los Angeles River, its principal source of water, was going to be enough.¹⁰ Los Angeles was encouraged by members of a San Fernando Valley land syndicate, who suggested that the city make immediate plans to tap the sources of the Owens Valley, 238 miles away.¹¹ This idea was not outlandish. In 1902 the United States Reclamation Service (later the Bureau of

⁸ David Hatfield Collection, Stephen E. Hatfield letter to Mollie Waite, June 28, 1900; *Hatfield Journal*; John B. Wallace, "Hatfield the Rain-Caller," *The Farm Journal*, March 1925.

⁹ Patterson, 7, 8.

¹⁰ Ford Ashman Carpenter, *Twenty Weather Reprints*, "Flood Studies at Los Angeles from November 1, 1877 to January 1, 1920" prepared by Department of Meteorology and Aeronautics, Los Angeles. (Los Angeles: Southwest Building and Contractor, January 9, 1920). The flood and drought periods show a cyclical occurrence of three to four years. Heavy floods occurred February 1884; December 1889; March 1911; January 1914; January 1916. The late 1890s were the driest years on record. Also see H.B. Lynch, *Rainfall and Stream Run-Off in Southern California Since 1769*, (Los Angeles: Metropolitan Water District of Southern California, 1931), 1-31.

¹¹ Boyle, 142. The idea appealed to the visionary instincts of the Los Angeles Power and Water Department, and thus was born one of California's unique institutions: water imperialism. Quite reasonably, the City of Los Angeles expected outrage on the part of the farmers of the Owens Valley, who tended to look upon its water as their own. To forestall any effective opposition, representatives of the department secretly managed to buy or obtain options to buy an immense amount of "riparian" land along both sides of existing irrigation ditches and the Owens River, in effect, giving itself the status of the largest single land owner in the valley.

Reclamation) had been created under the aegis of the Department of the Interior to construct major irrigation and flood-control projects throughout the west.¹²

Hatfield moved northward to the Los Angeles area where, in February 1904, he erected a thirty-five-foot "evaporating tower" near La Crescenta to begin his first public demonstration of "enhancing-moisture." The press had a field day, reporting Wednesday morning, February 3:

Rainmaker Hatfield is a sewing machine solicitor by day. By night he delves into the mysteries of penumbra and chirrus, air strata and all the queer habits of the realm above. Hatfield is sponsored in his operations as a drought destroyer by merchants on Spring Street, between Third and Fourth. It all came about this way: Like all business men of Los Angeles these dry days, a knot of Spring Street, shopkeepers were bewailing the lack of rain. "I can bring you an inch of rain in the next five days and it will cost you \$50," he said. "I know what I am talking about, for I have tried in sixteen times and only once have I failed. Count 'em gentlemen--sixteen times and only one failure--count 'em." When offered a dozen gold pieces Hatfield waved the money aside. "Not now," he said. "Cash on delivery is my method of doing business, you pay me when you get the rain."¹³

By Thursday, February 4 rain fell and continued through Friday for a total of 1.64 inches according to Hatfield's gauges. The *Los Angeles Evening Herald* ran a full front page with photographs of Hatfield's tower, himself and his mother, Marie (slightly elevated above Charles in a shine-like artistic presentation). Marie

¹² Lee, 18-21. The U.S. Reclamation Service by 1902 constructed the Yuma Project on the Colorado River, including the Laguna Diversion Dam, along with the Theodore Roosevelt Dam and Granite Reef Diversion Dam on the Salt River of Arizona. Imperial Valley farmers (they are not to be confused with Jefferson's vision of the yeoman farmer; these were industrialists practicing agri-business on a spectacular scale) considered their own needs at least equal to those of similar entrepreneurs in Arizona.

¹³ *Los Angeles Evening Herald*, February 3, 1904. Hatfield's operations were sponsored by R.B. Morehead, of the New Home Machine Co.; H.C. Ackley, of the Wheeler and Wilson Sewing Machine Co.; and other merchants. Brandon, 133. Cash on delivery was also the motto of the Singer Sewing Machine Company. If sufficient funds could not be raised, a payment schedule was also offered by the Singer Sewing Machine Company.

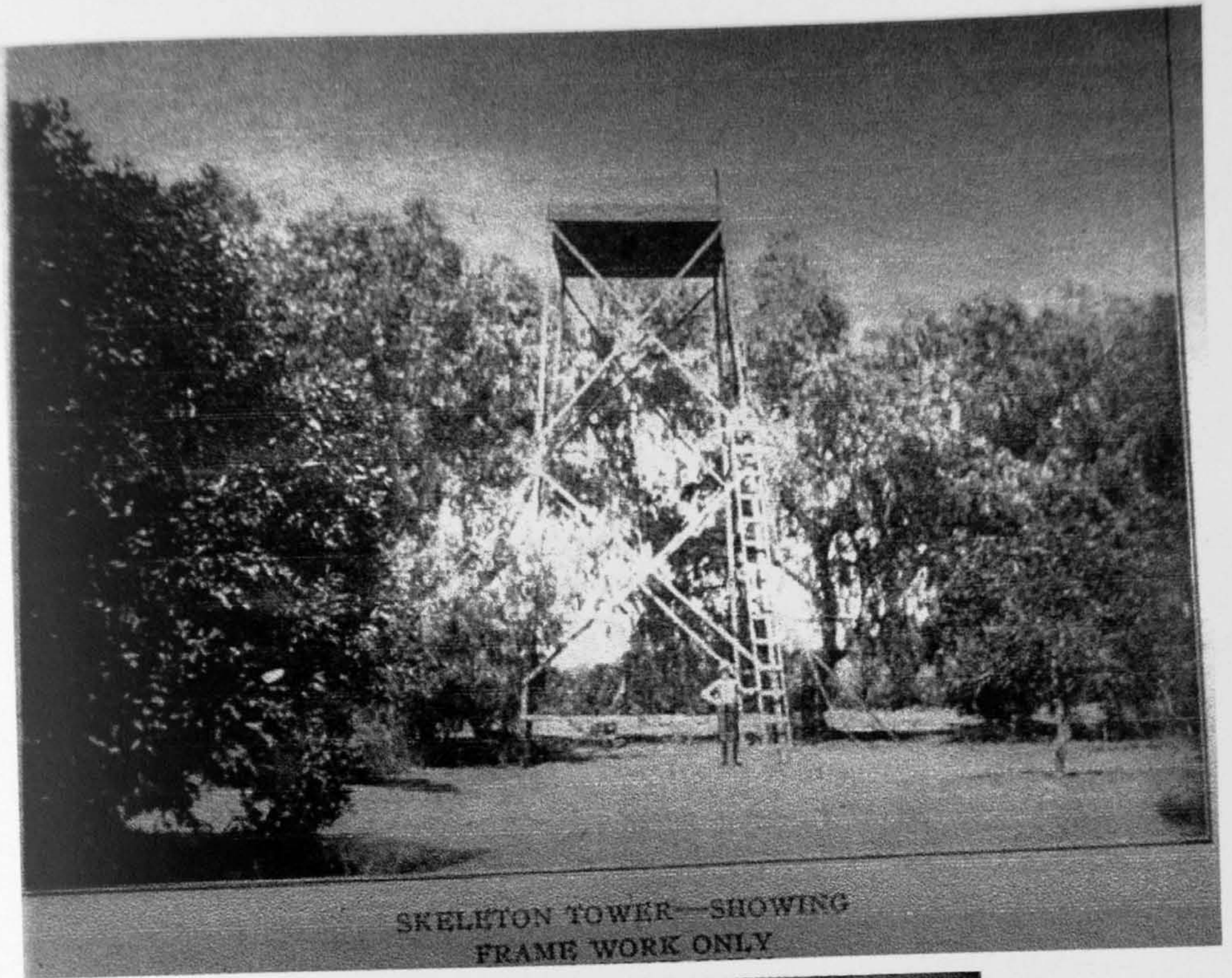
Figure 10

Hatfield's First Public Demonstration, 1904.
Charles Hatfield's first public demonstration using a thirty-five foot tower set at Big Tejunga Canyon. *Los Angeles Evening Herald*, February 3, 1904.

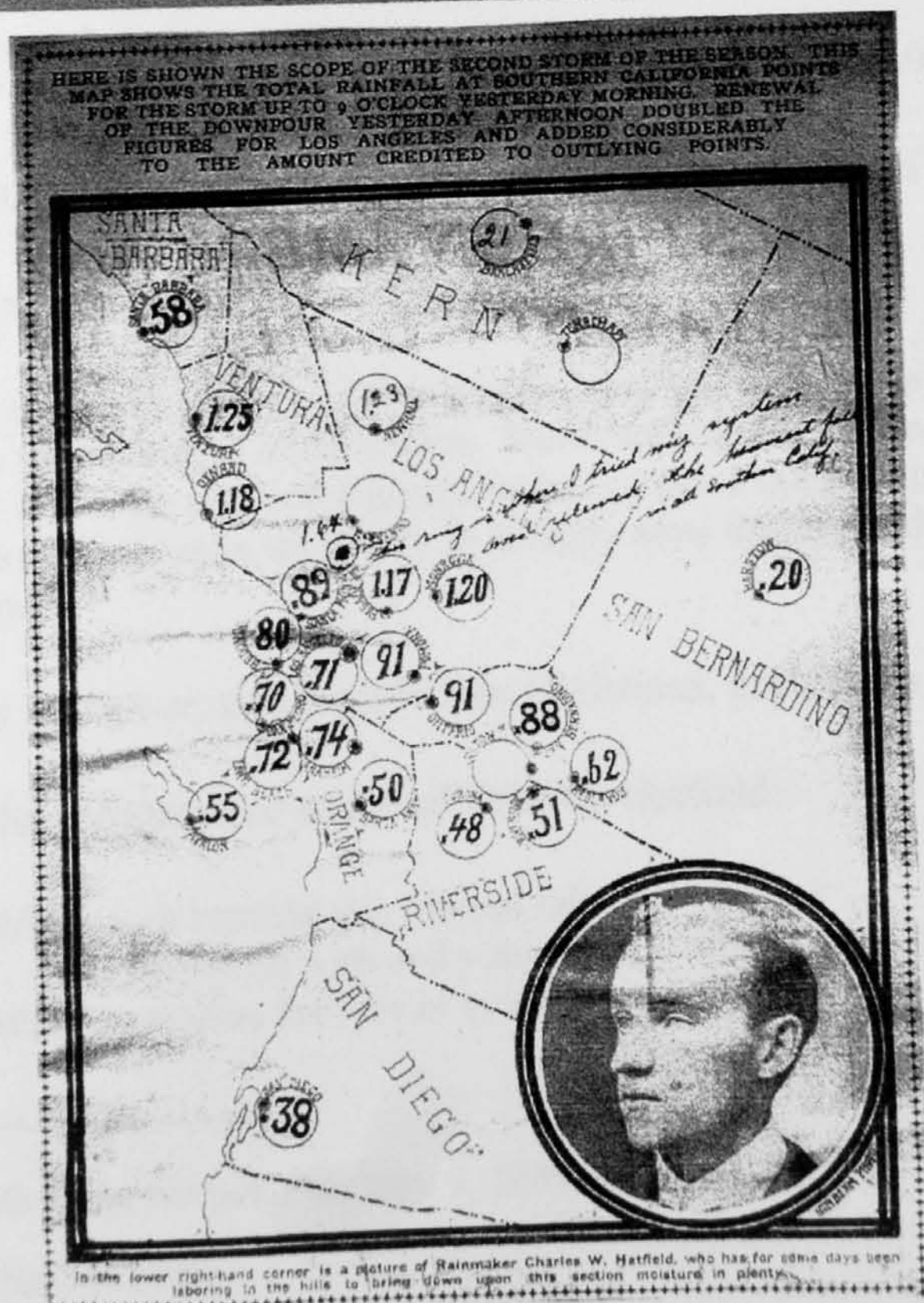
Figure 11

Hatfield's Notations on Weather Reporting, 1904.
"This ring is where I tried my system and received my heaviest fall in all Southern Calif."

Charles Hatfield's portrait is shown in the lower right-hand corner. Hatfield also filled in some rain amounts at the other weather reporting stations. These reporting stations were normally at railroad stations and the rain amounts are entered by hand just before press-time. *Los Angeles Examiner*, February 4, 1904. Charles Hatfield handwritten copy, courtesy of David Hatfield Collection.



SKELETON TOWER—SHOWING
FRAME WORK ONLY



Hatfield was quoted: "The people's prayer for rain have been answered through my son. For five years he has studied and struggled against prejudices. His determination is simply marvelous. Some divine power must aid him." Charles Hatfield was quoted in the *Los Angeles Evening Herald*:

My system is a purely scientific process. I noticed that the ministers of the city prayed for rain on Sunday and all they got were a few clouds on Monday. I started my process on Tuesday without a cloud in sight and Thursday night the rain came. I have a deep reverence for religion; many of my ancestors were clergymen, and the Rev. George T. Dowling of this city is my cousin; but in this case, I think science, as far as producing rain goes, is ahead of praying. I will say that I produce the rain locally by means of effect on the atmosphere of the evaporation of certain chemicals. All I have to demand for success is that there shall be some humidity in the air. The experiment is not so very costly, \$100 about covering the cost itself. I am not only willing, but will be glad to have the most searching investigation made. I will make the test at any time anyone wishes at any place.¹⁴

Later on in the year, on December 11 Hatfield returned to Los Angeles at the request of the farmers, increased his fee, and guaranteed for \$1,000 he could bring down eighteen inches of rain for the season. The *Los Angeles Evening Herald* quoted Hatfield saying:

I wish the people to understand that we have had only 1.49 inches of rain here since the beginning of the season. San Francisco has had twelve inches, so that if the required eighteen inches comes, I think I will be entitled to recognition in my ability to actually draw the rain and cause the downpour.¹⁵

The *Los Angeles Examiner*, two days before Christmas, provided a jingle congratulating the "progressive scientist" Charles Hatfield:

Who was it brought this blessed rain
by wizard's art and wiles,
Which wreathes the face of everyone

¹⁴ *Los Angeles Evening Herald*, February 7, 1904.

¹⁵ *Ibid.* December 11, 1904.

in genial, gentle smiles?
Just hold your breath and do not speak,
and we will give the name
Of this progressive scientist who's earned undying fame:

His name is Hatfield-
Just simply Hatfield!
The only name that Californians
speak;
Oh Mister Hatfield,
Here's to you Hatfield-
God bless you for that thankful
heavenly leak! ¹⁶

Hatfield produced over nineteen inches within sixty days and received \$1,000 in gold. George E. Franklin, Government Weather Forecaster and Chief of the Los Angeles Bureau noted that the rain, although not predicted by his bureau, was not caused by Hatfield's demonstrations:

"I would not to say that the preachers or the rainmaker is responsible for the rain. Personally I am inclined to think we should thank that power which for decades past has controlled such things. It seems queer to me that a man by a chemical assault on the heavens in the foothills in southern California should be responsible for a storm which began way up on the Oregon coast."

"Hatfield?" he [Franklin] spoke the name without generous note which once accompanied it, "is working for the \$1,000. We at the Weather Bureau are working for the good of the people at low wages." ¹⁷

"Hatfield? Why, of course, he had nothing to do with the rain. It would have come just the same, whether he had been here or not." ¹⁸

¹⁶ *Los Angeles Examiner*, December 23, 1904. "Mister Hatfield," jingle by E.A. Brinistool.

¹⁷ Hatfield Scrapbook, vol. 1, clippings, "Hatfield and Franklin Rivals for Honor of Bringing Rain" n.d., "Observer Franklin Thinks Storm is Past," n.d.; Tom Owens Hatfield Collection, "Refreshing Rain Falls Over Southern California Its Value Cannot Be Estimated," (1904 written in margin); *Los Angeles Evening Herald*, December 4, 1904, "Hatfield is drunk on rainwater, when he becomes sober he will bring his chemicals to the city and ask for Mr. Franklin's place." Charles Hatfield claimed he produced 19.52 inches of rain.

¹⁸ *Los Angeles Examiner*, December 23, 1904.

Figure 12

Newspaper Cartoon of Hatfield, 1904.
Los Angeles Evening Herald, February 7, 1904. Courtesy of the California
Room, San Diego Central Public Library.

Figure 13

U.S. Weather Bureau Forecaster George Franklin, ca. 1904.
Photograph of George Franklin, Chief of Los Angeles Weather Bureau. Hatfield
Scrapbook, vol. 1, clipping, ca. 1904.

WHOEVER IT WAS WE'RE GRATEFUL.



Franklin noted, "during the months of November, December and January, however, storms frequently come in from the sea without previous notice. I think this was what Forecaster A.G. McAde [McAdie] of San Francisco, had in mind when he predicted rain for southern California Tuesday."¹⁹ Hatfield, in verifying the amount of rain that fell, used the amounts published by the local office of the U.S. Weather Bureau. Although Hatfield measured the rainfall amounts with his own instruments, he was careful not to challenge the Weather Bureau's statistical data.

The First Water Congress of Southern California conference was held at the Chamber of Commerce, Los Angeles on March 13, 1905. The main issues of the conference were to determine the causes of the drought and decline of groundwater resources, to determine the rainfall amounts necessary to supply the nine main streams in southern California, and to discuss ways that local farmers and ranchers could use less water so that the larger water users could maintain their quota productions:

The last eleven years have shown a decline in rainfall each year. The large irrigating and domestic companies have been affected through the lessen flow of surface streams. Local users, ranchers and others have found that lands formerly moist enough for pasture and ordinary crops are now dry and require irrigation. In some cases the question of supply to [the small or local farms and ranches] is becoming acute, and the increased cost of water almost prohibitive for certain crops in unfavorable localities.

Further discussions centered on the forestation of the San Bernardino mountains by the Forestry Bureau of the Department of Agriculture; the regimented flow of

¹⁹ *Santa Monica Outlook*, December 22, 1904. "Hatfield had shoveled in a few scoopfalls of hydrorainophygistine and a small concoction of thunderino."

rivers by dams, especially the Colorado River; the concepts of dry farming and the value of sewage for irrigation.²⁰

Hatfield's rainmaking activities in years of limited water supply, caused by the over-irrigation of large domestic company lands, created an almost desperate need by small local farmers and ranchers. Hatfield, now confident about his abilities, began a series of successful rainmaking demonstrations throughout central and southern California, appealing to the desires of small farm owners. As the irrigation systems throughout southern California developed at slow pace, Hatfield's popularity and reputation grew enormously.

Returning to Altadena at the Esperanza Sanitarium in September 1905, Hatfield again agreed to bring eighteen inches of rain before he left for South Africa to fulfill a contract. The *Los Angeles Evening Herald* on September 10 reported Hatfield's intention to enter into a contract with nine owners of diamond mines and sheep ranches in Transvaal, South Africa. By December 24, 1905 Hatfield fulfilled his promise as rain fell in Altadena. He collected another \$1,000.

Before leaving for South Africa, The South Yuba Water Company in Nevada City contracted with Hatfield to create rain to end the drought in Grass

²⁰ Los Angeles Chamber of Commerce, *Proceedings of the First Water Congress of Southern California*, (Los Angeles, March 13, 1905), 6, 16, 17, 32-34, 48. Chairman Prof. A.J. Cook was being detained by high floods on the line of the Santa Fe Railroad and could not chair the meeting. Mr. James W. Toumey, Bureau of Forestry in the Agriculture Department, summarized their forestry experiments at the Arrow Head Reservoir Co. Lands on the northerly slope of the San Bernardino Range (desert side): "Because rainfall is most abundant where forests grow, many believe that forests exert an important inference on the amount of precipitation. A more reasonable influence, however, is that rainfall is the great factor in controlling the distribution and density of forests. Forests are the natural and greatest storage reservoirs and regulators of water supply."

Valley in the Sierra Mountains for \$250 to break a six month drought. In addition, the wheat farmers offered Hatfield \$100 per inch of rain. Seven days after starting his "rain-enhancing" demonstrations, two snowfalls of 36 inches deep fell. True to his scientific analysis, Hatfield estimated the snow amounted to four and one-half inches of rain.²¹ This event marks the first time Hatfield signed a contract that gave him a legal responsibility to produce rain. The contract, however, was in Hatfield's favor because there was no financial risk if he did not perform. He would simply not collect his money if he did not meet his obligation of producing certain amounts of rain. Hatfield noted that this demonstration was his "thirtieth successful experiment and the first to be attempted in the north." Hatfield also predicted in a newspaper account:

The chief point that I am working for is a reputation and that is what I am getting, to make the world a believer in something that was inevitable. Fifty years from now every State, every city in the Union, will have its rainmaking plants.²²

Hatfield, now "Professor" Charles Hatfield, was thinking of larger projects while participating in an all-out campaign against the U.S. Weather Bureau and local weathermen. Hatfield rarely complained, but it was becoming obvious that the attacks of the U.S. Weather Bureau were taking a toll as he announced to the press:

I have received the hardest 'knocking' a man ever suffered. Letters have been written to my correspondents to the effect that I am a faker, a grafter and several other things. Commercial organizations, corporation officials and ranchers who are asked to risk money upon a venture with a

²¹ *Los Angeles Evening Herald*, December 10, 1905.

²² *Los Angeles Examiner*, December 10, 1905. "Hatfield Wins Gold and Glory."

man about whom they know nothing except through correspondence, do not care to have dealings with a person such as my enemies are endeavoring to make me out. I knew the knockers had been at work again.²³

Hatfield found himself in constant conflict with local Weather Bureau Chief George E. Franklin. Franklin got so upset with Hatfield he wrote to U.S. Bureau Chief Willis Moore in Washington, D.C. requesting Moore to publish an official disclaimer about Hatfield's methods. The U.S. Weather Bureau tried to counter pro-Hatfield stories with a letter to each newspaper that would published them. Some of the rebuttals were printed, but long after Hatfield's demonstrations. Although the *Monthly Weather Review* in 1905 carried a detailed critique by Chief Willis Moore, it was hardly on the daily reading list of most Americans.²⁴ The press, however, promoted Hatfield's popularity throughout the United States. "Genuine Hatfield" umbrellas were being sold and the word "raining" was occasionally being replaced by "Hatfielding." Lectures were being given by Hatfield in Riverside, Redlands, Santa Barbara, San Bernardino, San Diego, and later in Arizona and New Mexico.²⁵ Hatfield was newsworthy. In 1905 the Los Angeles Department of Water and Power District announced its irrigation plans

²³ Ibid, October 16, 1905.

²⁴ *Monthly Weather Review* 33 (April 1905): 152-53. Hatfield Scrapbook, vol. 1, miscellaneous clippings. Franklin worked overtime in Los Angeles refuting Hatfield's pretensions. Weatherman Alexander McAdie in San Francisco was optimistic, especially when West Coast newspapers began to reprint Moore's warnings with blunt headlines: "Weather Chief Raps Hatfield;" "Hatfield Effort Puny, Says Chief;" and "Rain and Hot Air." San Francisco weatherman Alexander McAdie also wrote an article for *Sunset Magazine*, which was reprinted elsewhere, that condemned "rain-making experiments" without mentioning Hatfield by name and emphasized that all storms had been predicted by the Weather Bureau and that maps and forecasts had been readily available to all comers, including would-be "cloud compellers." Alexander McAdie, "The Los Angeles Rain-Making," *Sunset Magazine* 15 (October 1905): 575-78.

²⁵ Spence, 84.

and convinced the City Council to authorize a bond issue of \$25 million for the construction of an aqueduct from Owens Valley to Los Angeles.²⁶

Over the next ten years, Hatfield performed several "rain-enhancing" demonstrations throughout central and southern California. Crow's Landing, south of Modesto, had a record rainy season in 1906 and Hatfield entered into a long term, eight year contract with the wheat farmers.²⁷ On March 1, 1906 the *Dawson Daily News* announced that Hatfield had been hired to bring rain for mining operations in the Yukon Territory. When the proposal was raised in the Canadian House of Commons, not everyone was so positive. Member of Parliament George Foster warned against catastrophic dangers and speculated on international complications.²⁸ The contract was terminated because the mining operators claimed he could not meet the terms of his contract. Hatfield, nevertheless, was paid \$1,100 in full settlement. Hatfield argued he had not

²⁶ Boyle, 143. In the weeks before the vote on the bond issue, the citizens of Los Angeles were treated to an almost constant barrage of brochures, pamphlets and newspapers stories, chiefly in the *Los Angeles Times* of Harrison Gray Otis, outlining the city's dire and immediate need for Owens Valley water. It has even been suggested that an artificial water famine was created, city officials secretly dumping thousands of gallons into the sewer system just before election time. The charge has never been substantiated and the act probably would have been unnecessary in any case. The bond issue passed easily.

²⁷ Hatfield Collection, clipping, *Dawson Daily News*, April 13, 1906.

²⁸ Hatfield Scrapbook, vol. 1. Remarks of George E. Foster (March 26, 1906), *Official Report of Debates*, 10th Parliament, 2nd sess. (1906), 74:561 (portion found). Foster asked: "Suppose that man Hatfield gets his apparatus at work and tinkers with the vast and delicate atmosphere of the universe, is it not possible that he may pull out a plug, or slip a cog, and this machinery of the universe once started going wrong may go on to the complete submersion of this continent." Foster went on to speculate on the international complications and the possibility of a "tremendous bill for damages" should Hatfield interfere "with the vast chain of atmospherical mechanisms."

failed.²⁹

Following Dawson, Hatfield returned to California and back to Crow's Landing to "enhance" a surplus of rain and good press. Hatfield stated his rainmaking approach was "by coaxing and wheedling and courting." Hatfield's thoughtful interviews and explanation of his methods led to headlines of "Fine Appearing and Modest Young Man, with a Scientific Turn of Mind" and "Great Rainmaker Says He Does Not Force or Frighten Nature, but Gently Assists Her in Providing Showers for Needy Sections."³⁰ From there he went to Hemet and on to Sherman County, Oregon in 1908 and back to Crow's Landing in 1909. Hatfield's seventh contract at Crow's Landing involved farmers representing over 100,000 acres who felt his fees were a bargain following a downpour in late January 1909 and made him "the hero of the hour." "You may laugh if you like," a wheat grower remarked, "but I figure that I have made \$50,000 by Hatfield's operation."³¹

The race to bring irrigated water to southern California was being heavily promoted by large business interests. The Los Angeles Department of Water and Power had started the construction of the \$25 million aqueduct from Owens

²⁹ Hatfield Collection, clipping, *Yukon World*, n.d. Hatfield argued that he had not failed, that there had been a basic misunderstanding over the contract. He had brought rain on thirty-six of his forty-four workdays, Hatfield insisted, enough to provide adequate water for placer-mining cleanup--his interpretation of what he had agreed to deliver. Mine operators, on the other hand, expected enough water to carry on hydraulic mining, a far more difficult task requiring enormous amounts of water.

³⁰ Hatfield Scrapbook, vol. 1, clipping, *Stockton Daily Evening Record*, January 23 and February 15, 1907.

³¹ *Modesto Morning Herald*, January 29, 1911.

Figure 14

Charles Hatfield, Hemet, California, 1908.
Charles Hatfield with his rain towers, Hemet, California. Photo courtesy of the
San Diego Historical Society 84:15263, 1908.

Figure 15

Hatfield's Rain Towers at Carlsbad, Texas, 1912.
Charles Hatfield's towers and camp at Carlsbad, Texas. Photo courtesy of the
San Diego Historical Society, 14238-6, 1912.



Valley, supervised by William Mulholland.³² By 1911 several of the newly formed water districts began to take aggressive actions towards constructing their own canal and irrigation systems. The Imperial (Valley) Irrigation District required a major dam and new canal to be constructed for flood control. This construction was a necessity since the Imperial Canal was built for most of its length on Mexican soil and the district was committed to deliver up to half the river's diverted flow to rich delta lands below the border. One of the sites under consideration for the dam was Boulder Canyon, at the upper reaches of the Colorado River.

Cooperative irrigation investigations for the immediate supply of water to citrus orchards throughout southern California were made by the United States Office of Experimental Stations, Department of Agriculture in 1912.³³ By 1914, forty-nine water districts had been formed in the state with twenty-six districts located in San Diego-Imperial County and Los Angeles County. There were fifty-two counties in California in 1907.³⁴ The La Mesa, Lemon Grove and Spring Valley irrigation districts of San Diego County received their water from the Morena Reservoir via the Barrett Reservoir to the Upper and Lower Otay Reservoirs. As the area began to experience a severe drought in 1910, the City of

³² Boyle, 143.

³³ State of California, Department of Engineering *Bulletin No. 1 Progress Report of Cooperative Irrigation Investigations in California 1912-1914*. (Sacramento: California State Printing Office, 1915), 38-43.

³⁴ *Ibid*, 9.

San Diego took over those water districts on October 17, 1913.³⁵

After returning from a successful rainmaking event in 1912 near Carlsbad, Texas, in which he erected three towers and received payment through a unique "subscription" scheme that local farmers could afford, Hatfield decided to contact Fred Binney, his unofficial agent in San Diego.³⁶ Frederick A. Binney, a large whiskered man with a doubtful British accent, was a promoter of the sulphuric-acid-and-zinc approach and the use of liquid air to cool the atmosphere. In 1899 Binney had a citrus orchard in Otay, but lost two-thirds of the orchard to a winter drought. Binney also developed the idea of harnessing windmills to provide electrical power in the California mountains.³⁷ Binney approached the San Diego City Council in 1912 to use Hatfield's talents to end the two-year drought, but was refused.³⁸

During 1913 to 1914 Hatfield continued his battles with the U.S. Weather Bureau and left the matter of negotiations with San Diego to Fred Binney.

Hatfield was negotiating with a South African farm organization outlining his

³⁵ Shelley J. Higgins, *This Fantastic City San Diego*. (San Diego: City of San Diego, 1956) 175. In the mid-decade of 1910-1920, this region experienced a sequence of years when there seemed to be adequate annual rainfall, but distributed in such sparse manner there was no appreciable runoff. The water supply dwindled alarmingly. This low supply became acute in 1915. Otay Reservoir rainfall record: Year 1910, 8.46 inches; 1911, 9.56; 1912, 14.08; 1913, 6.93; 1914, 10.14; and 1915, 14.14 inches. See also Lynch, Appendix C, San Diego Area, 1850-1930.

³⁶ Clipping, *San Angelo Daily Standard*, Texas, June 1912, Hatfield Collection. Hatfield prepared a scheme to "sell" over 200 subscriptions to raise \$3,000 for his services so that no one farmer would need to pay a large amount. The range of subscriptions were voluntary and included a high of \$100, Baker-Hemphill Co.; \$5, Sam Pollock; \$2.50, W.B. Sayer to a low of \$1.00, Scarborough & Donaho (a large corporation).

³⁷ Spence, 79.

³⁸ Patterson, 14.

eight to nine years of experience and successful commercial contracts. Hatfield's offer was denied once again through the efforts of Weather Bureau Chief Willis Moore.³⁹ The Owens-Valley aqueduct was completed in 1913, as thousands gathered on the banks of the Los Angeles canal to watch the river flow.⁴⁰

Hatfield, with the help of Binney, appeared before a group of San Diego city councilmen in conference to tell them he could fill Morena Reservoir. By the end of 1915, with the drought in its fifth year and Morena Reservoir uncomfortably low, and Otay Reservoir almost empty, the city council was willing to listen to Hatfield's proposal. People were arriving by the thousands at the Santa Fe Railroad Station and staying at new concrete "high-rise" buildings in downtown San Diego, anxious to visit the successful Panama-California International Exposition in Balboa Park.⁴¹ San Diego was continuing talks with the U.S. Reclamation Service regarding Colorado water, but Los Angeles was

³⁹ Hatfield Scrapbook vol. 1, letters C. Stewart to Moore, February 1913/no other date/copy; Moore to Stewart, March 19, 1913, copy. Hatfield expressed a willingness to make rain in the northwest Karoo for a \$10,000 fee, plus transportation from Los Angeles to South Africa and back for himself and an assistant. As part of a parliamentary inquiry pursuing the matter, the chief meteorologist of the Irrigation Department of Pretoria wrote the Weather Bureau in Washington about "rain inducer" Hatfield and his "remarkable statements which, to say the least, are certainly not lacking in self-confidence." Chief Willis Moore ended Hatfield's African travel plans abruptly, denouncing him as "practicing deception, preying on public credulity, and making a dire necessity the occasion for the perpetrating of fraud."

⁴⁰ Boyle, 144. The *Times* cheered with banner headlines and thousands gathered on the banks of the canal to salute the first surge of water as it roared by, not on its way to Los Angeles, but to a reservoir in the northern end of the rural San Fernando Valley. Not until the city annexed the valley in 1915 did the city begin receiving Owens Valley water. This, together with the fact that some of the project's most vigorous supporters including Harrison Gray Otis had realized a fortune in the sale of water-improved valley land after its completion, led to accusations, periodically revised, that the whole thing was nothing less than a "colossal swindle" on the citizens of Los Angeles.

⁴¹ Richard W. Amero, "The Making of the Panama-California Exposition 1909-1915," *The Journal of San Diego History* 1 (Winter 1990): 9.

negotiating the expansion of their system and the Service could not devote time to select a site for a dam. Hatfield presented a proposal to the San Diego City Council on December 9, 1915:

I will fill the Morena Reservoir to overflowing between now and next December 20, 1916, for the sum of \$10,000, in default of which I ask no compensation.

The vote was four to one authorizing Hatfield to fulfil his proposal with Councilman Fay dissenting, calling it "rank foolishness." The formal agreement was never drawn up and Hatfield began work at Morena Reservoir on January 1, 1916 with only a verbal understanding.⁴²

At Morena Reservoir, Charles Hatfield, along with his youngest brother Joel, erected their tower and reported rain on January 5. On January 9 the *San Diego Union* ran a feature story on the Weather Bureau's San Diego Office and Chief Forecaster Herbert Nimmo. Nimmo discussed the storm centers moving from the north Pacific southeastward across California. Nimmo and the *San Diego Union* ignored Hatfield.⁴³ Rain began to fall heavily on January 10 and continued for twenty-four hours. On January 14 it rained torrents and continued until the 18th. The San Diego River went over its banks and flooded Old Town. The Santa Fe and San Diego-Arizona rail connections were put out of service and most of the highways were closed. The semi-utopian colony of Little Landers was

⁴² *San Diego Union*, December 10 and 14, 1915. The majority of Hatfield's contracts appear to be "gentlemen's agreements" and never signed.

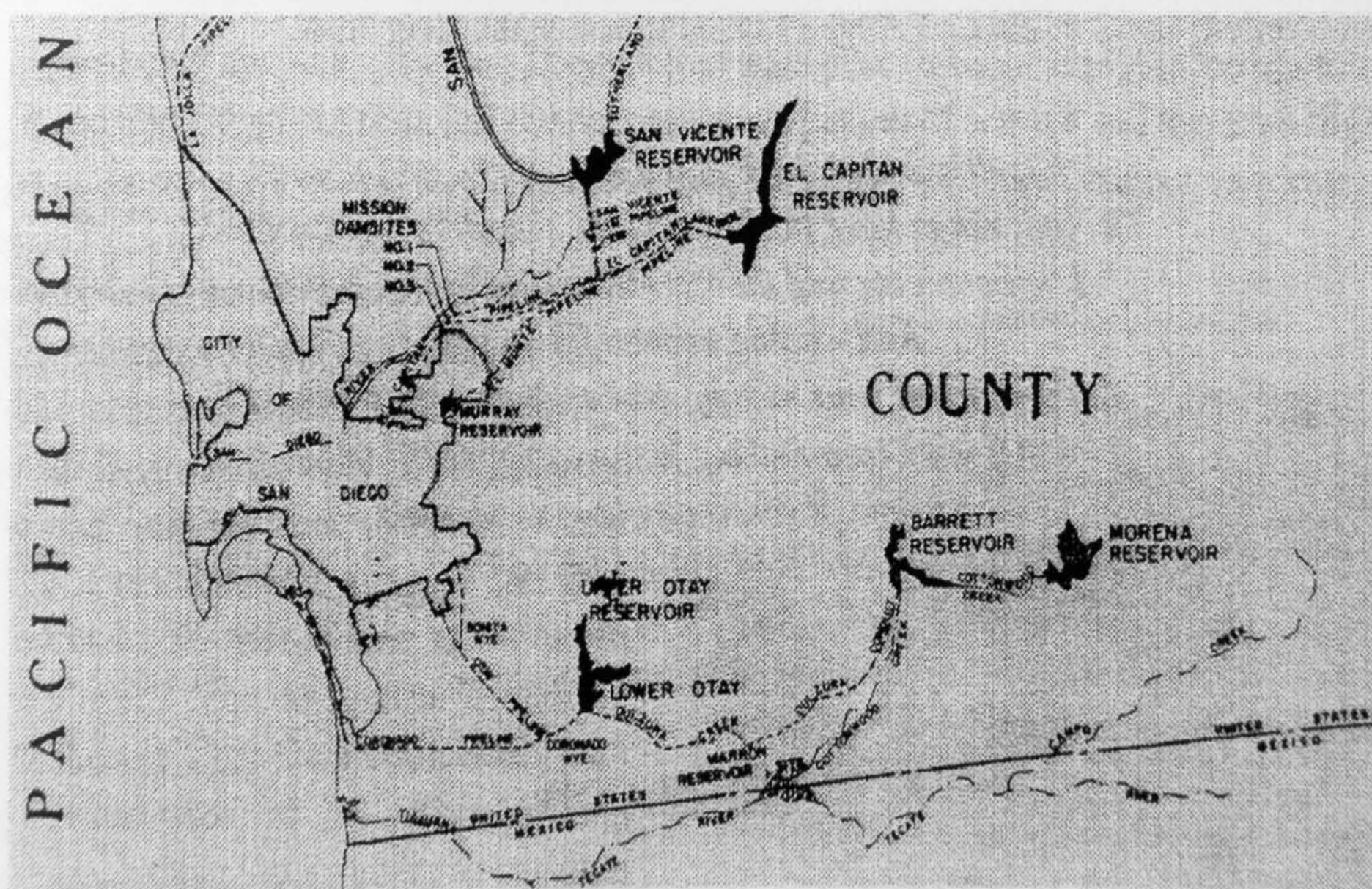
⁴³ *Ibid*, January 9, 1915.

Figure 16

“Moisture-Enhancing” Tower at Morena Reservoir, 1916.
The “moisture-enhancing” tower has been constructed at Morena Reservoir with Charles and Joel posing for the camera. There is nowhere to place the twenty-foot long piece of lumber being held by Joel. Photo courtesy of the San Diego Historical Society 86:15806, 1916.

Figure 17

San Diego Aqueduct Map, 1956.
Portion of the San Diego Aqueduct map prepared by the engineering division of the San Diego City Water Department to help explain the 1916 flood. From Shelly J. Higgins, *This Fantastic City San Diego*. San Diego: City of San Diego, 1956, 186.



destroyed.⁴⁴

For the next week, there was intermittent rain until the evening of January 25 when an even more powerful storm drenched the county. Sweetwater Dam overflowed and the reservoir rose to three and one-half feet above the dam. Soon, the north abutment wing of the dam collapsed and a ninety-foot section at the north end broke open. The devastation increased when the Lower Otay Dam completely tore open. A tidal wave of thirteen billion gallons rushed through Otay Valley on its seven-mile journey to San Diego Bay. Over thirty-five inches had fallen in one month throughout San Diego County, "\$3.5 million in damage" occurred, and "14 people died" as a result of the flood.⁴⁵

San Diego, isolated from the rest of the state following the flood, was a disaster area. For two weeks there was no access across Mission Valley and the telegraph lines were out for seven days. Over one hundred city and county bridges were washed away. "Hatfield's Hatful" created the worst disaster in San

⁴⁴ Patterson, "Hatfield the Rainmaker," 17. Little Landers, a colony began by W.E. Smythe, located in the valley of the Tijuana River, north of the international border contained about 40 families, 100 persons or more. This utopian-type colony, based upon communal living of one acre irrigated plots, was completely destroyed by the floods literally carrying the land away. Two persons drowned. In San Diego, the first of several relief funds were started for the victims.

⁴⁵ Higgins, 181. There are several different accounts of the flood regarding the cost of the damages and loss of life from newspapers and other writings. Shelley J. Higgins' personal account is based upon testimony given to the San Diego City Council following the flood. For a detailed account of damage throughout San Diego County, see Patterson. Patterson notes "20 to 50 people died." San Diego County Coroner Record Book 1789-3092, 1916-1917, records at least twenty-six people drowned or were killed by action of the flood. Three persons died in Oceanside and one in Jamul. Eight persons were Japanese and bodies were found as far away as the shore of Coronado Island. See also Richard F. Pourade, *Gold in the Sun, The History of San Diego*. (San Diego: Union-Tribune Publishing Company, 1965), 203-216 for a detail damage account as told by the Copley newspapers.

Diego's history and the county at large.⁴⁶ No fresh water could be consumed and people had to boil water for drinking. Thousands of horses, cattle, goats and domestic animals were dead or roaming the city streets for days. Legal action was soon to follow.

It was reported that Hatfield and his younger brother Joel fled on horseback across the desert toward Yuma "and we never heard of him again for many, many years."⁴⁷ This report by the *San Diego Union* was in error. The Hatfields walked the sixty miles from Morena Reservoir to San Diego and held a press conference in Fred Binney's office on Seventh Street on February 4.⁴⁸ The *San Diego Union* reported:

Great benefits from rain shown by reports from all over the back country. Several year's water supply results from recent storm throughout County. Where damage will give many employment and put much money into circulation.⁴⁹

Charles Hatfield claimed he had fulfilled his contract, Morena Reservoir was full and he wanted his \$10,000. A tough, shrewd city attorney, Terence Cosgrove, declared that there was no written or signed legal contract and until proven otherwise, the flood was "an act of God."⁵⁰ Hatfield claimed he was responsible for four billion gallons of water in the reservoir and God was

⁴⁶ Ibid, 180-185. "The flood of 1862, however, is said to have been the largest on the San Diego River or at San Diego. The cloud burst of August 12, 1891 at Campo, in which 11.50 inches of rain are said to fallen in 80 minutes, is an extreme example of this type [January 1916] of storm. Fortunately, falls of this intensity are rare."

⁴⁷ *San Diego Union*, January 26, 1916.

⁴⁸ David Hatfield Collection. Charles Hatfield writes in column of the *San Diego Union*, January 26, 1916 article "Press Conference at Binney's, February 4."

⁴⁹ *San Diego Union*, February 5, 1916.

⁵⁰ *San Diego Union*, February 18 and 29, 1916.

Figure 18

Break in the Sweetwater Dam, 1916.
Water pouring through the break in the Sweetwater Dam, originally built by the Santa Fe railroad in 1888. Photo courtesy of the San Diego Historical Society, 134-B, January 30, 1916.

Figure 19

Washout in Old Town, 1916.
Remains of concrete bridge at Old Town. Photo courtesy of the San Diego Historical Society, 6018, January 28, 1916.



responsible for the additional ten billion gallons, causing the flood and damage. Hatfield argued that his reputation was more important than the money and announced he would settle for \$4,000.⁵¹ When his offer was turned down, he filed a lawsuit against the city. The city offered to pay Hatfield's claim if he would sign a statement for full responsibility for the flood. With the potential of \$3.5 million in claims pending, Hatfield did not agree.⁵² The City of San Diego successfully defended two additional lawsuits for damages with the cause of the flood being determined to be "an act of God."⁵³

The Weather Bureau in California reported the San Diego affair to Washington, D.C. The barrage of publicity went national as Hatfield continued to declare his methods were scientific, not magic. In August 1919, *Everybody's Magazine* carried a color illustrated article "The Man the Rain Minds," and claimed Hatfield had over "500 successful demonstrations" with very few disappointments.⁵⁴ Apparently, this story was based upon an earlier article about a

⁵¹ *San Diego Union*, February 22, 1916. Hatfield proposes "of the ten billion gallons of water impounded in Morena during the life of my demonstrations, four billion gallons is my property and remains so until paid for by you. This four billion gallons of water of \$1,000 per billion gallons, equals \$4,000." Eventually a lawsuit was entered into by Hatfield against the City of San Diego.

⁵² Superior Court Records, Older Records Section. San Diego. Civil Case No. 26602, *Chas. M. Hatfield v. City of San Diego*, filed December 2, 1916. Microfilm: Old Civil and Criminal: OCC 623, from 26568 to 26625. When Hatfield inspected Morena Reservoir on December 10, 1915 it "contained approximately five billion gallons of water, about one-third of its then capacity." Sweetwater was reported to only hold a maximum of six billion gallons of water. State of California, *Bulletin No. 2 Irrigation Districts in California 1887-1915*, 8.

⁵³ Higgins, 181. Two cases were tried outside San Diego County; one in Orange County and the other in San Bernardino County, both dealt with property damage. Another suit, that of a salt works which was washed out at San Diego bayside in the path of the Otay flood, was filed too late, after the statutory deadlines.

⁵⁴ Hatfield Collections, San Diego Public Central Library, loose article, Charles Alma
(continued...)

rainmaker that operated in the desert, a place where Hatfield never tried to "enhance moisture."⁵⁵

Towards the end of 1916 Professor Charles F. Marvin, Chief of the Weather Bureau, published the first official document, *Weather Forecasting in the United States*. The document began as a project in 1913 with an attempt to collect all the data possible on how weather forecasts are made in order to publish a manual for the training of forecasters working for the Weather Bureau. The weather stations, located at many of the railroad stations in southern California, continued to report current weather and rainfall but there was no official forecasting. William J. Humphreys was acknowledged as a contributor. The United States was divided into six Forecast Districts with the San Francisco District containing the states of California and Nevada. The conclusions arrived for the accuracy of weather forecasting in the San Francisco District by the U.S. Weather Bureau are as follows:

This experience [weather forecasting] has led me [Professor W.H. Hammon, forecaster] to believe that no one can ever hope to successfully forecast the weather in this district [San Francisco District] by any definite set of rules.

This [weather] is a very unsatisfactory condition to the forecaster, as the precipitation, while often heavy, is mostly confined to the mountain region and is seldom shown at the regular Weather Bureau stations. His [forecaster] forecast is an official failure, but his consolation is gained

⁵⁴(...continued)

Byers, "The Man the Rain Minds," *Everybody's Magazine* 41 (August 1919), 110-112.

⁵⁵ Hatfield Collections, San Diego Public Central Library, loose article, Margaret Adelaide Wilson, "The Rain-Makers," *Scribner's Magazine* 61 (April 1917): 503-9. This short story in *Scribner's* featured a rainmaker who must have been drawn from Hatfield's life. He was a "smell-maker" who used towers and exhibited tremendous faith in himself and his process. He died of snakebite, a tragic figure on the desert, just as "his" rain began to fall.

from press and cooperative observers' reports.⁵⁶

*Oh, Mr. Hatfield, make 'em hum,
And let that welcome wetness come;
Stir those chemicals up again,
You need money-and we need rain.*⁵⁷

The Reclamation Extension Act of 1914 tended towards the limitation of the services provided by the government and the Secretary of the Interior was authorized to turn over to local control "the care, operation and maintenance of all or any part of water project works." By 1919 there were no principal irrigation projects in southern and central California. Only the Yuma project at the border of California and Arizona and the Orland project along the Sacramento River in northern California were underway by the U.S. Reclamation Service. Although over twenty-six separate projects were underway across the western United States, California could only claim the one at Orland.⁵⁸ Charles Hatfield's demonstrations were still in high demand from the local farmer and rancher who could not pay for expensive irrigated water.

During the early 1920s Hatfield continued his successful rain-enhancing demonstrations, but not without more harassment from the U.S. Weather Bureau. Contacted by the farmers and ranchers in Alberta, Canada in 1921 Hatfield was

⁵⁶ United States Department of Agriculture, Weather Bureau, "Weather Forecasting in the United States." (Washington D.C.: United States Government Printing Office, 1916), 1, 336-337.

⁵⁷ Hatfield Scrapbook, vol. 2, unidentified clipping by H.J.R. (Initials only)

⁵⁸ Institute for Government Research, *The U.S. Reclamation Service*, (New York: D. Appleton and Company, 1919), 90-97. The highest paid employee of the service was the Consulting Engineer to the Secretary of the Interior at \$5,000 per year. The average wage for an employee was \$1,500 per year.

discredited by the Lethbridge Board of Trade when it sought professional advice from the U.S. Weather Bureau and the Dominion Meteorological Office in Toronto.⁵⁹

Fred Binney was still active in California, working on a scheme to have Congress purchase Hatfield's secret formula, giving Hatfield an annuity of \$24,000, and to operate the process throughout the arid west under the supervision of the of Forestry Bureau, Department of Agriculture. Apparently, the Forest Bureau ignored the offer.⁶⁰

Binney proposed to the San Diego City Council that Hatfield be brought back to end another drought and reminded them that the 1916 lawsuit was still pending and that Hatfield might be inclined to drop it, if so hired.⁶¹ Although Hatfield received numerous offers to work outside the United States, he preferred to work in the San Joaquin Valley and southern California.

Powell Davis, head of the United States Reclamation Service, recommended in 1921 that Boulder Canyon in Nevada be selected for the construction of a large water-storage, flood-control and power-producing dam on the upper reaches of the Colorado.⁶²

⁵⁹ Hatfield Scrapbook, vol. 2, clipping, *Lethbridge Daily Herald*, January 31, 1920. The Lethbridge Board of Trade published the adverse replies by the U.S. Weather Bureau in the newspaper warning that "if citizens wished to spend eight or nine thousand dollars, they should invest it in irrigation, not in a big lumber stand with some washing soda on the top."

⁶⁰ David Hatfield Collection. Copy of letter, H.J. Hanson to Leon Eastabrook, December 29, 1920.

⁶¹ *San Diego Sun*, April 30, 1921.

⁶² Boyle, 149. *Sunday Times*, March 30, 1924.

In 1925, David Starr Jordan, president emeritus of Stanford University invented the word "pluviculture" to describe the marketing of rainmaking schemes as "a never-failing drought crop."⁶³ Apparently, Jordan's attack on rainmakers was not meant for Hatfield. In the public's eye, "scientist" Hatfield could indeed produce rain as he continued to collect check after check.⁶⁴ The *Los Angeles Sunday Times* summed up public attitudes in March 1924:

Some think Hatfield is merely a great showman; others something less complimentary, but some, and always enough for his purposes, think him a man ahead of his time, who can do what the United States Weather Bureau and all modern science say is impossible.⁶⁵

Hatfield's most successful "moisture-enhancing" demonstrations occurred in the hills west of Coalinga (Coaling Station A) at King's County, located west of the San Joaquin Valley in March, 1924; Tulare Lake in 1925-1926; and the greatest of all rainfall and washout at Sand Canyon, near Randsburg in the Mojave Desert on August 1, 1922. Sand Canyon, a gorge descending from the Sierra Nevada Mountains in Southern California, became the site of the most spectacular rainfall, a cloud burst resulting in 240 inches within one hour. The waters swept more than thirty-foot deep over the Los Angeles aqueduct. The twenty-foot thick mud back flowed into the Mojave Desert, covering an area fifteen miles wide and destroying

⁶³ Humphreys, viii.

⁶⁴ Hatfield Scrapbook, vol. 2, loose clippings. Hatfield's press was exceptionally good at this time and several creative phrases were used to describe his activities: "Tower of Showers," *San Francisco Call and Post*, March 15, 1924; "persuading Jupiter Pluvius to turn on the celestial sprinkling cart," and "Tickling the Clouds to Tears," *San Francisco Examiner*, March 17 and 18, 1924; "Old Jupe was angry" and it "rained little fishes," *Los Angeles Sunday Times*, March 30, 1924; "Ponzi of the Skies," *Fresno Bee*, April 2, 1924; and "wearing his \$8,000 smile," *Los Angeles Evening Herald*, March 27, 1924.

⁶⁵ *Los Angeles Sunday Times*, March 30, 1924.

Figure 20

Newspaper Cartoon of Charles Hatfield, 1924.
Charles Hatfield's successful "moisture-enhancing" demonstrations in the hills
west of Coalinga; San Joaquin Valley. Cartoon, *Los Angeles Sunday Times*,
March 30, 1924.

Los Angeles Sunday Times

SUNDAY MORNING, MARCH 30, 1924.

POPUI

Waters Covered the Earth---and Charlie Slept In a Tree



ten miles of the Southern Pacific's railroad tracks.⁶⁶

In 1930 Paul and Charles Hatfield traveled to Honduras at the request of the Standard Steamship and Fruit Company of New Orleans to create rain for the farmers of the drought-stricken banana lands.⁶⁷ Hatfield, upon returning from his Honduras trip, was working in real estate, selling sewing machines, and was apparently depressed.⁶⁸ It appears there were domestic problems between Charles Hatfield and his first wife, Mabelle Clair.

In 1931 Mabelle won a divorce settlement against Charles Hatfield claiming that her husband had received as much as \$10,000 for producing rain in Honduras in 1930. Hatfield told her that the "Honduras farmers refused to pay." The court approved a settlement calling for a division of the property and the "payment of seven dollars per week by Hatfield for the support of their 13 year-old son, Richard."⁶⁹ "The action came on one of California's 'unusual' days with the skies overcast with rain clouds."⁷⁰ The Honduras demonstration was the last major rain-producing event performed by Charles and Paul Hatfield.

By the mid 1930s the Bureau of Reclamation was recommending that the federal government end their involvement with collection of installment payments for the cost of construction and maintenance of irrigation systems throughout

⁶⁶ *Popular Science Monthly*, February, 1923, 44-45; *Los Angeles Times*, August 2, 1922.

⁶⁷ *Glendale News Press*, March 29, 1930.

⁶⁸ *San Diego Union*, February 24, 1931.

⁶⁹ David Hatfield, personal communication. Charles Hatfield never had children. The reference was probably to Robert, Paul Hatfield's son. Charles Hatfield married Paul's second wife, Mabelle Clair, and the two were seen occasionally with Robert.

⁷⁰ *San Diego Union*, March 25, 1931.

Figure 21

Sand Canyon Flood near Randsburg, Mojave Desert, 1922.
The great flood at Sand Canyon, Sierra Nevada Mountains near Randsburg in southern California. "This bird-eyes' view shows the vast sea of mud in the flood's nine-mile rush down the canyon to be deposited in the Mojave Desert." *Popular Science Monthly*, February 1923, 45.

Figure 22

Scientific Explanation of Sand Canyon Flood, 1922.
"The diagrammatic sketch illustrates the scientific explanation of the cloud bust." The cloud burst was reported to drop 240 inches of rain within one hour. *Popular Science Monthly*, February 1923, 45. "Where the Bottom Fell Out of the Sky."

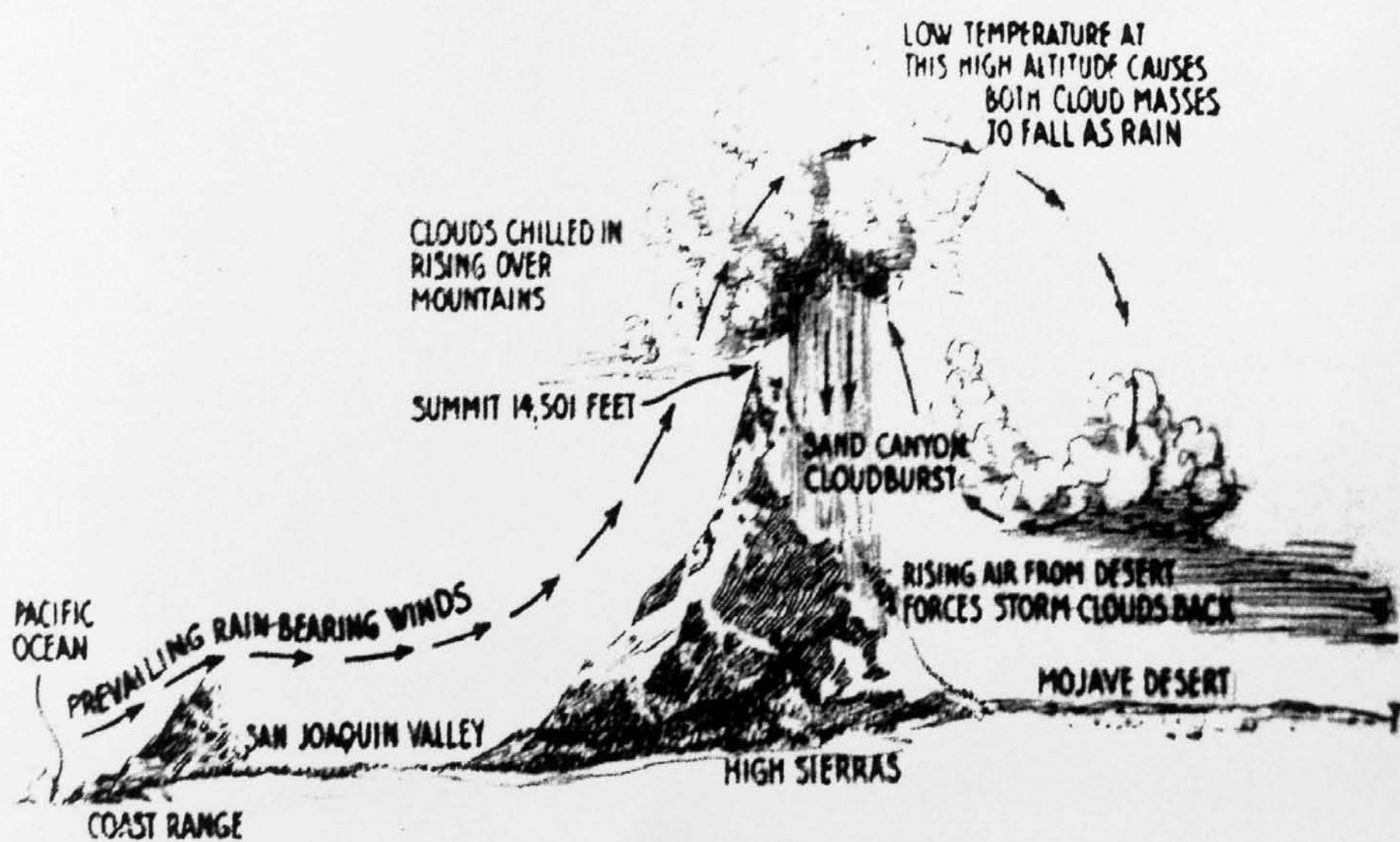
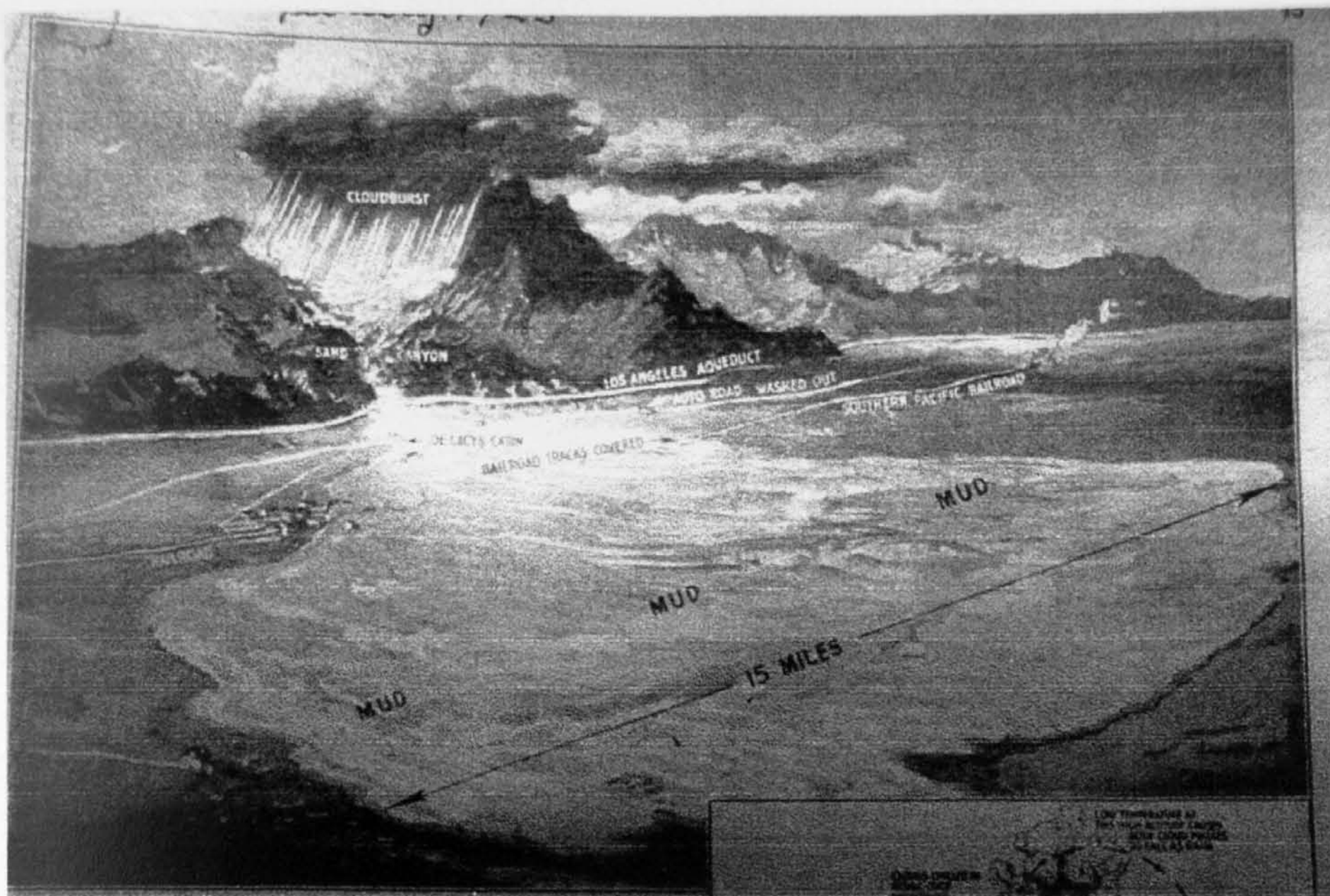
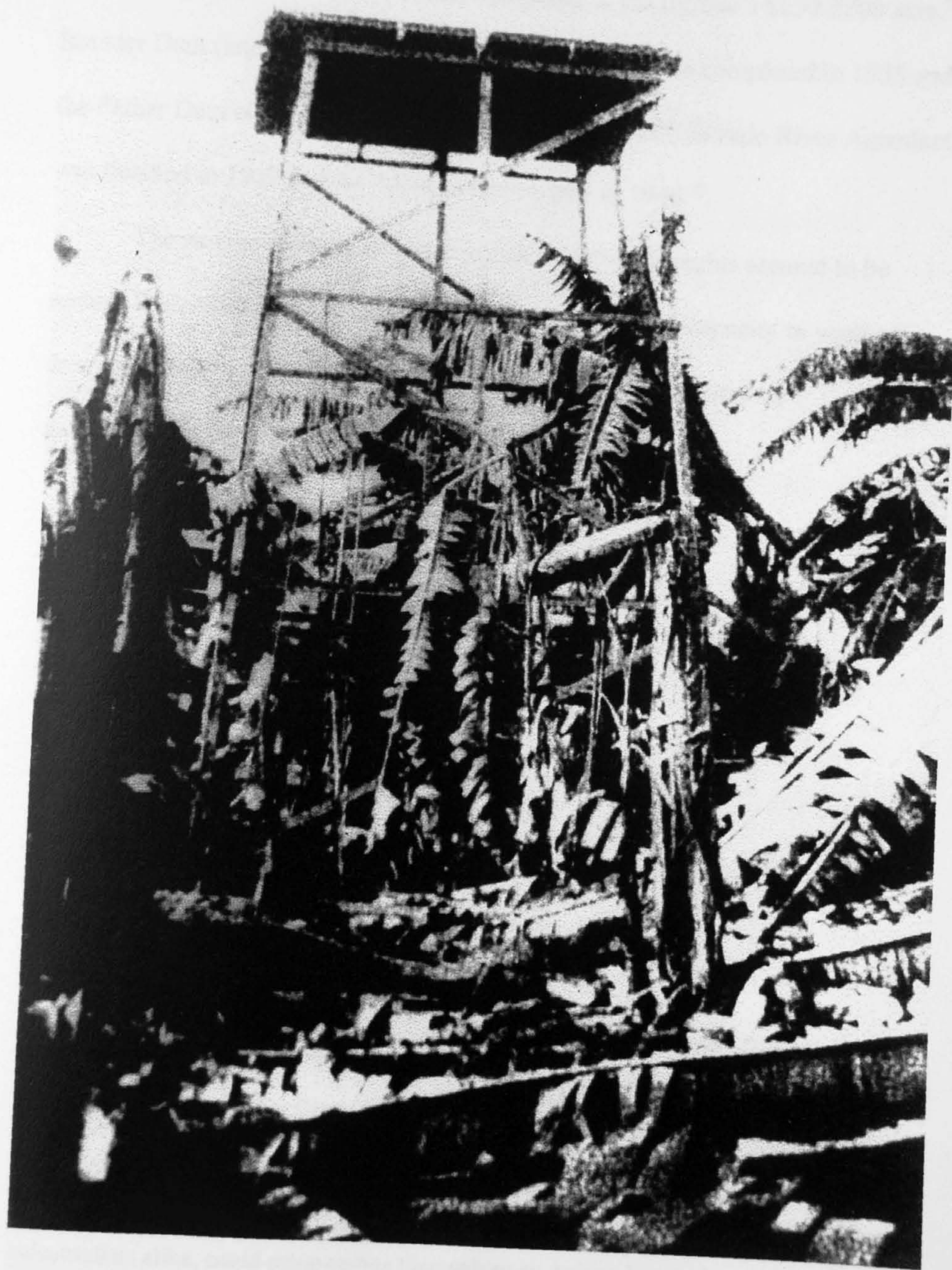


Figure 23

Hatfield's Last Demonstration, Honduras, ca. 1930.
The last "moisture-enhancing" demonstration by Charles and Paul Hatfield in Honduras, ca. 1930. Photo courtesy of David Hatfield Collection.



southern California. The responsibility for "selling water" should be left to the local water districts. The average cost for water as sold by the local districts instantly dropped to \$40-\$50 per acre compared to the Bureau's \$150-\$200 acre.⁷¹ Boulder Dam (later politically renamed Hoover Dam) was completed in 1935 and the Parker Dam along with Imperial Dam in 1938. The Colorado River Aqueduct was finished in 1939 and the All-American Canal in 1940.⁷²

The storage capacity of water in case of future droughts seemed to be secure. With reliable, fairly inexpensive water and storage capacity to ward off droughts, there was no longer a need for Hatfield's "rain-enhancing" demonstrations.

⁷¹ United States Department of the Interior, "Report on Federal Reclamation to the Secretary of the Interior, December 1, 1934." (Washington D.C.: United States Government Printing Office, 1935), 6-9. Also see Carl Joseph Courtemanche, "The Utilization of Water in San Diego County From 1890 to 1940: A Cultural Analysis," Ph.D. diss., San Diego State University, 1982.

⁷² Boyle, 150. The total cost of these projects was more than \$400 million. "It was the most ambitious and costly water development undertaking in the history of the United States up to that time, and the citizens of southern California, city dwellers and agri-industrialists alike, could congratulate themselves on having inspired one of the engineering triumphs of the century, one that would ensure them an adequate water supply for at least another forty years, and who could look beyond forty years?"

*Why not draw from the clouds above us
All the moisture needed here
And make the rolling plains around us
Fields of corn and meadows dear.¹*

CHAPTER FIVE

THE SCIENTIFIC RAINMAKERS

In the late 1920s and early 1930s physicist Charles T. Knipp of the University of Illinois experimented in the laboratory and produced "rain" by shooting a powerful electric current through water-saturated air when the barometer was falling. Knipp never sought to apply his idea on a practical basis. Knipp's theory was sound, and like James Espy's experiments seventy years earlier, the matter of scale precluded viable results.² Artificial precipitation began to become a limited field for "serious scholarly inquiry."

At the age of 56 and single, Hatfield's fame was still high in the drought-ridden 1930s. In 1930, 1934 and again in 1936, Hatfield offered to bring his talents to combat the devastation of mid-America for only expense money.³ Several Californians, during the height of the dust-bowl drought, urged President Franklin Roosevelt to hire Hatfield to make it rain. "Six to eight of his towers set

¹ Hatfield Scrapbook, vol.2. Ella Sibley to Henry A. Wallace, August 1, 1936. Sibley quotes a poem from unknown sources in her letter.

² Spence, 103, 135. Additional research was being conducted by Tor Bergeron, Swedish scientist in the early 1930s to explain the growth of moisture particles into drops large enough to fall. In the middle 1930s Dutchman August W. Veraat was seeding clouds using chipped ice and dry ice with limited success. In 1938 Walter Findeisen, a German scientist, expanded on Bergeron's idea by the introduction of artificial sublimation nuclei and began the Cloud Research Institute.

³ Hatfield Scrapbook, vol. 2. Clipping, *Los Angeles Evening Herald*, August 6, 1930; *Glendale News-Press*, August 9, 1934; *San Diego Sun*, July 18, 1936.

Figure 24

Charles Hatfield and His Evaporating Pans, 1931.
Charles Hatfield, at age 56 with his evaporating pans. The pans were stacked in a similar fashion on top of his towers. Photo courtesy of the San Diego Historical Society, 81:9774, 1931.



up in Kansas or Nebraska should do the trick.”⁴ The *Kansas City Star* promoted Hatfield to come to Kansas and set-up his towers, publishing three full pages on Hatfield, complete with color images. In the same article, the U.S. Weather Bureau recommended that the United States Government should plant tall rows of trees across the West to act as wind breaks known as “The Shelter Belt” in order to end the drought.⁵

Hatfield returned to drought-stricken San Diego in 1946 to “tell the truth” about how he and his brother Joel “liberated certain influences on the air that caused the moisture to precipitate.” Continuing to carefully guard his secret formulas Hatfield said he never got paid for the 1916 rain and “It was the first time on any of my thirty rainmaking jobs that I didn’t get paid.” Hatfield didn’t receive any money and left reminding San Diego there is a dry season and replied “Well, if you want some rain, my system is better than it ever was.”⁶

In November 1946, Vincent J. Schaefer and Nobel Laureate Irving Langmuir scattered dry ice over the clouds near Santa Fe, New Mexico resulting in rain. Langmuir came back on December 6, 1949 to conduct a series of tests under Project Cirrus for the Bureau of Reclamation. This time Langmuir used a series of ground-mounted generators burning silver iodide mixed in acetone and

⁴ David Hatfield Collection, loose letters: Fred Johnson to Roosevelt, August 19, 1934; Mrs. Walter E. Lyon to Roosevelt, May 8, 1934. There were several letters in the Hatfield Collection, mostly asking for help to end the drought in many lands throughout the world.

⁵ *The Kansas City Star*, August 12, 1934.

⁶ *San Diego Union*, September 26, 1946. If Hatfield received payment for all of his jobs except from the City of San Diego, then maybe he did get paid for his project in Honduras in 1930.

propane and, as he turned the generators off and on, successfully made the rain fall "at will."⁷ The cost of silver iodide was only "\$1 for 4,000 square miles."⁸

The San Diego City Council, in June 1948, decided to hire a rainmaker to end the two-year drought, but not Charles Hatfield. The city council appropriated \$750 as the city's share of the \$3,000, 135-day experiment and hired noted meteorologist, Dr. Irving P. [Click] Krick of the California Institute of Technology. "This 1948 model is no mixer of secret chemicals, no builder of towers and no man to promise miracles" reported the *San Diego Union*. Shelley Higgins, then Assistant City Attorney, was assigned the task of putting a contract together to prevent legal difficulties. Dr. Krick did his work, but no rains fell.⁹

In late December 1955, the northern and central portions of California experienced one of the most devastating storms in the state's recorded history. The storm covered an area of 100,000 square miles. Nowhere were the results of this storm more tragic than in the area of Yuba City, lying at the confluence of the Feather and Yuba Rivers. Confident that the levee system would protect them, the residents did not evacuate and therefore received the full force of the river when the levees collapsed and flood waters flowed over 100,000 acres, causing damages on the order of \$65 million. Thirty-seven persons perished; 3,227 persons were

⁷ Barrington S. Havens, "Early History of Cloud Seeding, The History of Project Cirrus," (Socorro, New Mexico: Langmuir Laboratory, 1978), 37-39.

⁸ Halacy, 90-91. Texas cattlemen complained that the droughts during the late 1940s and early 1950s were caused by large-scale cloud seeding in the West and Southwest and that all experimental projects should stop immediately. Four thousand square miles results in approximately 2,560,000 acres. The cost to bring water to the land per acre would be approximately \$0.0000004.

⁹ *San Diego Union*, June 9, 1948.

Figure 25

New Rain-Making Method, 1951.

"The New Rain-Making Method - Diagram shows how [a] ground generator projects tiny iodide particles into the atmosphere, carried to the clouds by natural turbulence and updrafts. Above 10,000 feet, where temperatures are well below freezing, each particle becomes a potential snowflake and falls either as snow or rain. A single generator, it is stated, is effective over several hundred square miles. The new method envisions 'tapping' clouds over a wide area in a cooperative venture, rather than attempting to drain individual clouds over individual properties [with airplanes]."

Topeka Daily Capital, May 27, 1951.

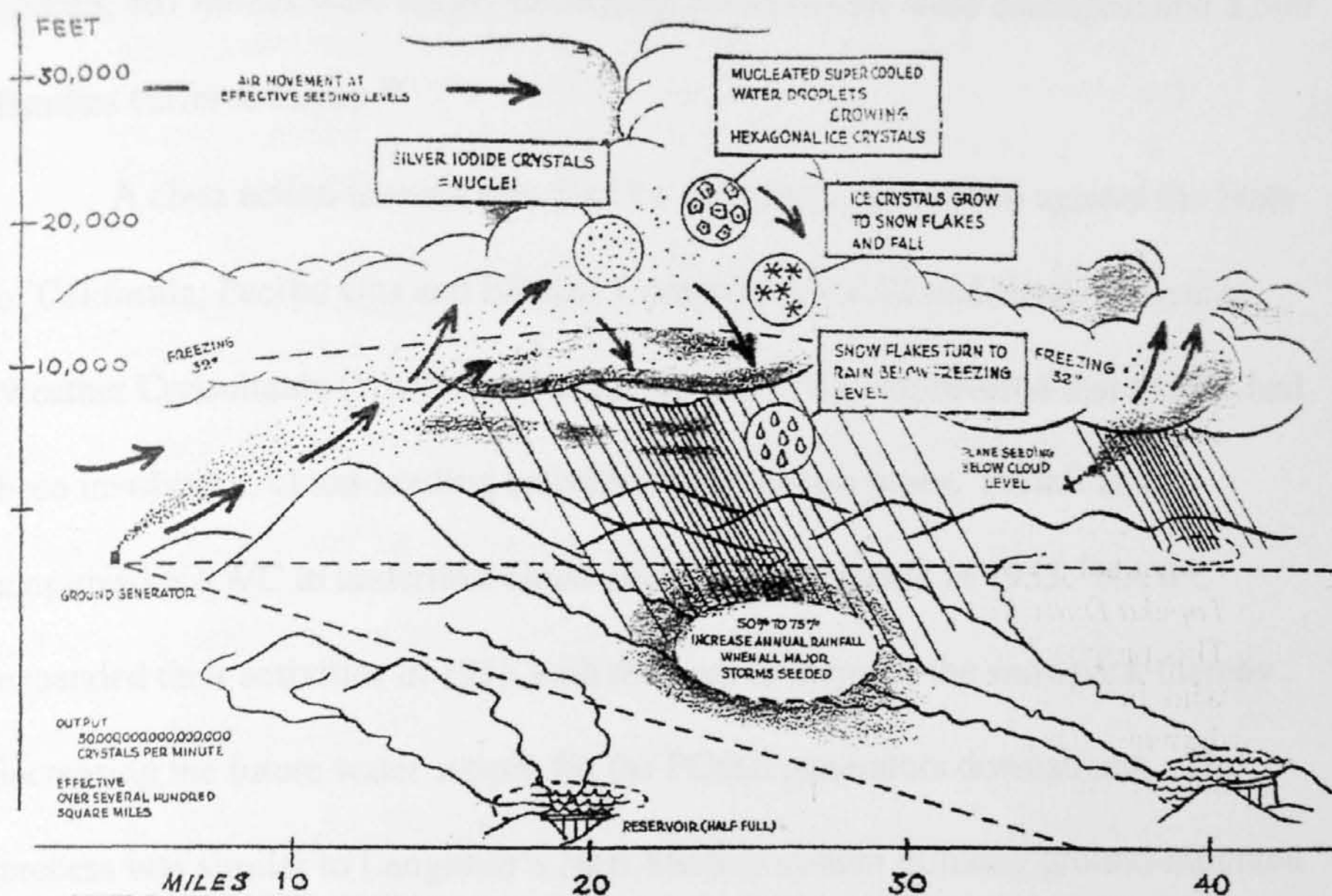
This proposal was introduced by scientist Dr. Irving P. Krick, a meteorologist who in 1948 tried to produce rain in San Diego, and failed. Notice in the drawing that a plane seeding below cloud level produces rain over a relatively small area.

Figure 26

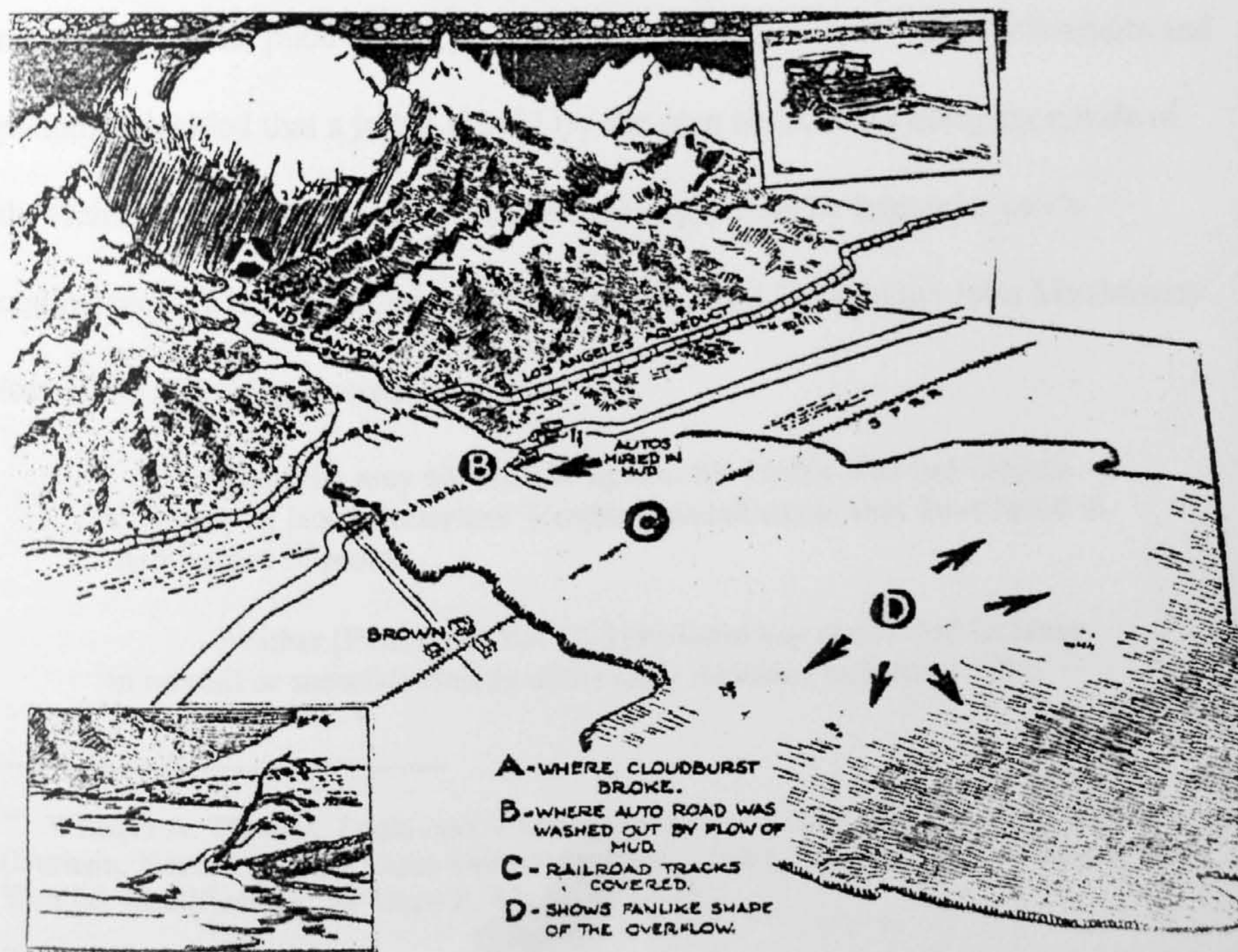
Comparative Drawing of the Sand Canyon Flood, 1922.

The great flood at Sand Canyon, Sierra Nevada Mountains near Randsburg in southern California on August 1, 1922. Charles Hatfield claimed that this was his most ambitious experimental demonstration in producing rainfall, 240 inches in less than an hour. There was no client and no compensation for this demonstration.

Los Angeles Times, August 2, 1922.



NEW RAIN-MAKING METHOD—Diagram shows how ground generator projects tiny iodide particles into the atmosphere, carried to the clouds by natural turbulence and updrafts. Above 10,000 feet, where temperatures are well below freezing, each particle becomes a potential snowflake and falls either as snow or rain. A single generator, it is stated, is effective over several hundred square miles. The new method envisions "tapping" clouds over a wide area in a co-operative venture, rather than attempting to drain individual clouds over individual properties.



injured; 467 homes were totally destroyed; 5,745 homes were damaged; and 8,500 families suffered losses.¹⁰

A class action lawsuit was filed by 150 plaintiffs in 1956 against the State of California, Pacific Gas and Electric Company (PG&E) and North American Weather Consultants (NAWC). During the trial it was discovered that PG&E had been involved in cloud-seeding activities for over two years. PG&E first employed NAWC to undertake cloud-seeding experiments in 1953. NAWC expanded their activities in 1955 with the goal to increase the snowpack thereby increasing the future water supply for the PG&E generators downstream. The process was similar to Langmuir's New Mexico system utilizing ground-mounted generators and silver iodide particles. Out of ten causes of action, eight focused on the design of the levee system and two against PG&E for rainmaking, considered by the plaintiffs as an "ultra-hazardous activity."¹¹ The defendants and plaintiffs decided that a judge should try the case because the complex nature of the technical information regarding rainmaking would be beyond a jury's competence. The trial lasted two years and in April 1958 Judge John MacMurray issued the following decision:

Plaintiffs may not recover against the Pacific Gas and Electric Company or North American Weather Consultants as they have failed in their burden of proof....

Neither [PG&E nor NAWC] produced any significant increase in rainfall or snowfall outside of the Lake Almanor watershed. The

¹⁰ William A. Thomas, *Legal and Scientific Uncertainties of Weather Modification*. (Durham, North Carolina: Duke University Press, 1976), "The Yuba City Episode in Weather Modification" by Dean E. Mann, 101-115.

¹¹ Ibid, 102-103.

effects of cloud seeding were limited to the pre-determined target area which drains only into Lake Almanor. Lake Almanor never spilled at any time before or during the flood; accordingly, any increase produced by cloud seeding was successfully impounded by that Pacific Gas and Electric Company lake.

The breaking of the levees was neither proximately caused nor contributed to either by the maintenance or by the operation of the artificial rainmaking equipment of any defendant in this lawsuit.

The court held that the breaking of the levees was due to faulty designs by the State of California and the levees should have either held the water, or allowed the water to be controlled as it was let out of the levees. The State of California settled for \$6.3 million.¹²

In 1957 Charles Hatfield was 81 years old and in Hollywood showing his scrapbooks to actress Yvonne Lime and actor Earl Holliman who appeared in Paramount's "*The Rainmaker*," starring Burt Lancaster and Katherine Hepburn.¹³ Charles Hatfield was asked about his rain-making formula and would only say

¹² Ibid, 110. The testimony focused on how the silver iodide was emitted from the generators, then transported with lower air movement until caught up in convection cells that rapidly lifted it to regions of cooler air where nucleation could begin. The crucial questions, then, were the extent to which such cells were present, the rate of ascent of the silver iodide plume, the elevation at which the required temperatures were found, and the time required for silver iodide to cause moisture to crystallized. The arguments from both sides resulted in a constant stream of calculations, models, diagrams and historic cloud-seeding activities. PG&E, in summing up, "If it [cloud-seeding] is branded by the courts as ultra-hazardous, it will be shunned by research organizations and universities. The insurance industry will undoubtedly refuse to underwrite it and private enterprise will no longer be able to engage in it." During the course of the Yuba City litigation, NAWC lost its insurance.

¹³ *Los Angeles Herald & Express*, December 11, 1956; also see the film, *The Rainmaker*, by Paramount, 1956. The film does not represent Hatfield's life, methods or personality. A charismatic con man (a character expressly written for Lancaster) blows into a drought-stricken town and transforms it and the local spinster (Hepburn), more with audacity and idealism than from his unproved weather-changing powers using lighting rods sold from a huckster's wagon; *Los Angeles Herald & Express*, February 26, 1942, Hatfield appeared as a guest on the Robert Wade Swan radio show on KFAC 1330 on February 25, 1942; another attempt to portray Hatfield on video was created by Peter Brian Maxwell, *Waiting for Rain, Charles Hatfield in San Diego: A Historical Documentary*, Videotape Project for his Master of Arts Degree at San Diego State University, 1995.

"That's my secret, I may pass it on later, but I won't tell now. The rain of 1916 was an act of Hatfield, not an act of God."¹⁴ Charles Hatfield died on January 12, 1958 at the home of his brother Paul, in Pearblossom, California. The graveyard ceremony at Forest Lawn Memorial Park in Los Angeles was attended only by his brother Paul and Paul's wife. It was a clear sunny day.¹⁵

Three years after Charles Hatfield's death, and on the forty-fifth anniversary of the San Diego Flood of 1916, Dr. Don I. Eldemiller, a member of the San Diego State (University) Geography Department and a meteorologist said finally there could be no doubt about it: "Hatfield had nothing to do with producing the rain." Eldemiller went on to present charts, rainfall amounts and storm reports for January 1916. He concluded that there were four air masses coming together to create four fronts.¹⁶ The fiftieth anniversary of the flood was "celebrated" in 1966, and Paul, then 80, commented on the 1916 event and stated once again they never got paid by the [San Diego] city council. Paul said he could come down to San Diego and repeat the same amount of rainfall because he "still has and is guarding the secret of the chemicals and processes that he and his brother used." At the same time, the city was asking Congress to authorize \$22.3 million for the Mission Valley Flood Control Channel following a record 3.46

¹⁴ *San Diego Union*, February 3, 1957.

¹⁵ *Los Angeles Times*, April 15, 1958. The banner line read, "Death of Rainmaker Hatfield Kept Secret."

¹⁶ *San Diego Union*, January 2, 1961. Speaking in the "cold war" language of the day, Eldemiller went on to say "modern rain makers are able to cause clouds to shed rain by supplying artificial nuclei for raindrops, but Hatfield boasted his system worked to bring the clouds to San Diego. To have supplied enough energy to produce weather patterns such as occurred in January 1916 would have taken several hundred hydrogen bombs."

inch downpour (worst in twenty-five years) on December 10-12, 1965.¹⁷

The State of California in 1965 required the licensing of all persons engaged in weather modification and required a notice of intent prior to any project.¹⁸ Several states, following California's model, now require some form of control over the modification of the weather. The First National Conference on Weather Modification was sponsored by the American Meteorological Society in New York in 1968. The consensus of the proceedings was that "increase in rainfall, hail and lightning suppression, fog dispersal and hurricane control are noble scientific programs that need to be pursued with considerable theoretical work in conjunction with laboratory and field experiments." The Bureau of Reclamation in its discussions at the end of the conference noted the dangers of chemical toxicity in the atmosphere and that personal hygiene and washing the body are useful tools for protection. The Bureau noted that it "could not support weather-modification experiments unless they could be under the control of the Weather Bureau."¹⁹

Charles Hatfield's brother and partner in rain-enhancing demonstrations for over forty years returned to San Diego, along with his son David, to donate a

¹⁷ *San Diego Union*, December 12, 1965. Paul also noted that the rainmaking secret is a valuable commercial property and he might consider turning it over to the United States government; *San Diego Union*, January 18, 1972. When Paul Hatfield returned to San Diego to donate a portion of the Hatfield Collection and "rainmaking apparatus," he noted that he does not plan to give the formula to his son, David. "Suppose he [David] had it. He'd have to go out and buy the chemicals. The first thing you know they'd be getting onto it. There's always some shrewd fellow putting two and two together."

¹⁸ Halacy, 211-213.

¹⁹ William J. Douglas, "Proceedings of the Toxic Properties of Materials used in Weather Modification," American Meteorological Society, 1968, 355.

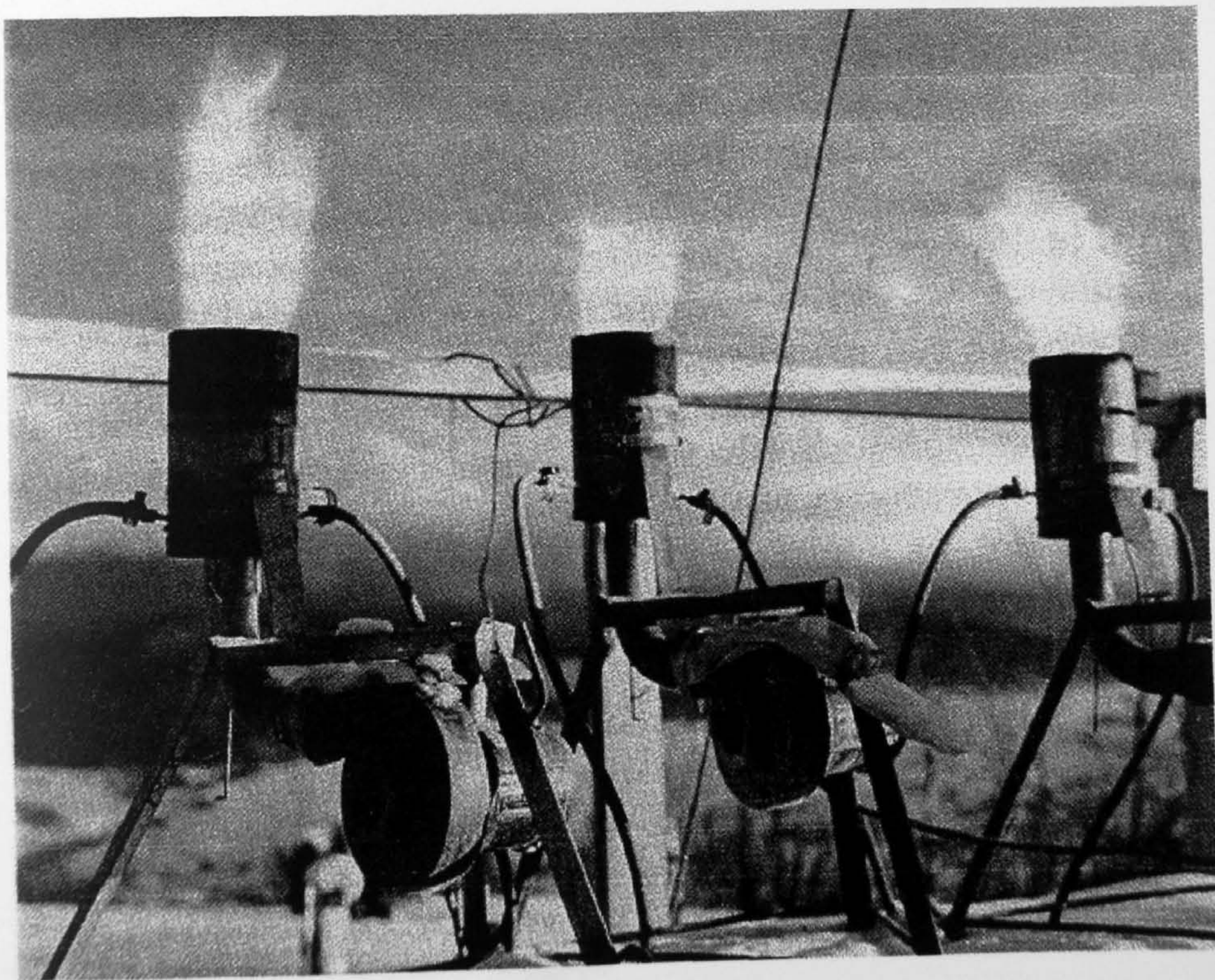
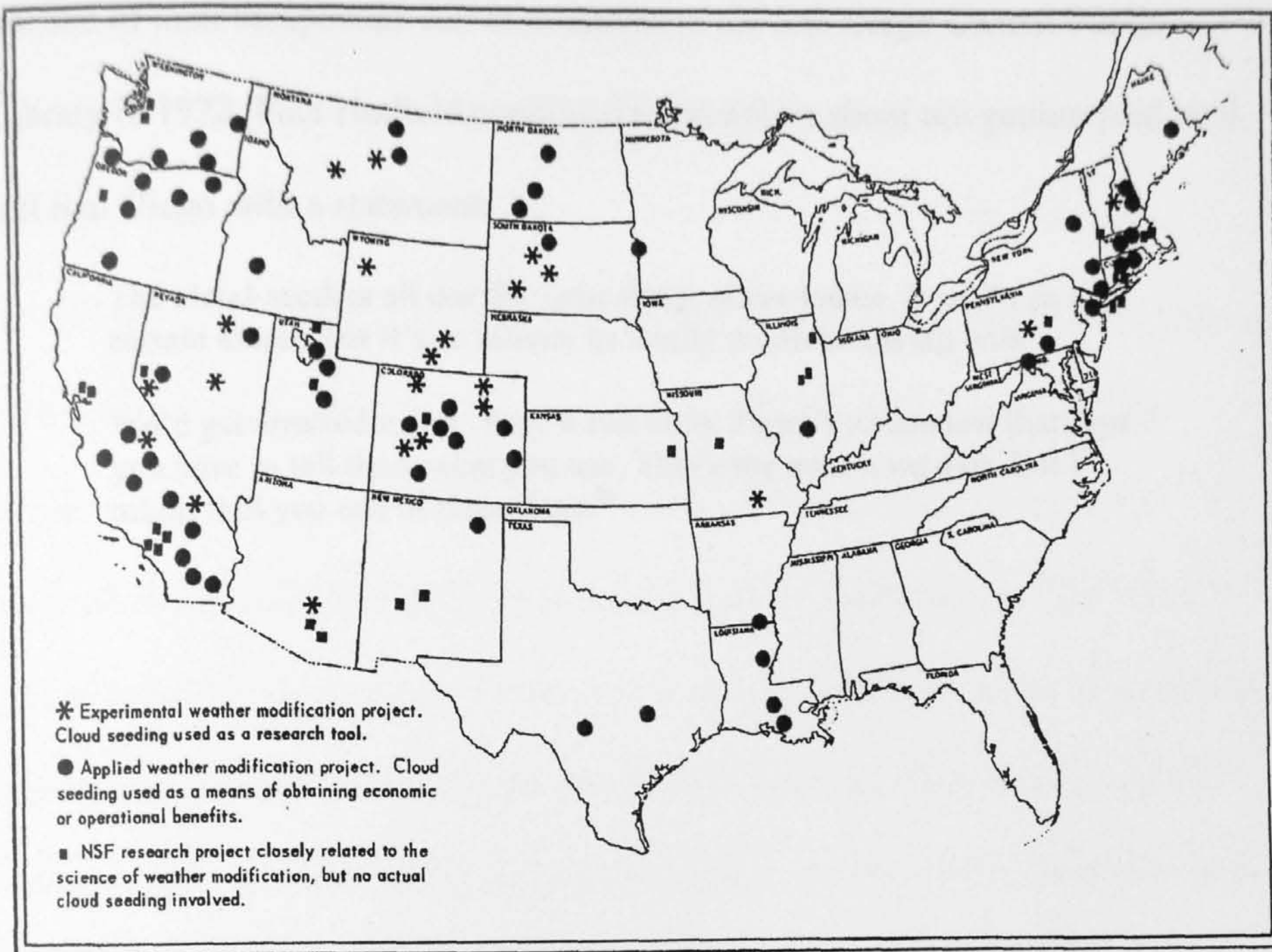
Figure 27

Weather Modification Projects in the United States, 1965.
Weather modification projects in the United States, 1965. From D.S. Halacy, Jr.,
The Weather Changers. (New York: Harper & Row Publishers, 1968), 106.

Figure 28

Silver-Iodide Generators, ca. 1955.

A bank of silver-iodide generators used by the Bureau of Reclamation for cloud seeding. The generators burn silver iodide mixed in acetone and propane. From D.S. Halacy Jr., *The Weather Changers*. (New York: Harper & Row Publishers, 1968), 91.



portion of their scrapbooks and instruments to the San Diego Central Public Library in 1972. Paul Hatfield continued to complain about not getting paid, and left San Diego with a statement:

The cloud-seeders all use the same thing, silver iodine. It works to a certain extent, but it's so minute its hardly worth bothering with.

We'd get arrested today. They'd run us in. There's a state law that says you have to tell them what you use. That's the reason we quit. But I might fool you one of these days.²⁰

²⁰ *San Diego Union*, January 18, 1972.

CHAPTER SIX EPILOGUE

For many of us, it seems surprising that farmers and ranchers were willing to throw their hard-earned money at rainmakers. In the 1880s, however, the "march for progress" was evident everywhere in transportation through the railroad and automobile, in farm machinery, and the reclamation of the West. These beliefs might lead one to believe that the practical application of science to control the weather was here in the late 1880s. Certainly, there were scientific theorists not interested in selling their knowledge, that brought some stature to the concept of artificial rainfall. James Espy, the first meteorologist and pioneer of explaining how rain is produced; Edward Powers, a renowned civil engineer; the well-educated Robert Dyrenforth of military science and Charles Post, all participated in rain-producing experiments.

Even the scientists among the rainmakers were salesmen of a sort, like the electrified-sand dusters of the 1920s. Leon Chaffee of Harvard was a pioneer in electronics; Wilder Bancroft of Cornell would become the president of both the American Chemical Society and the American Electrochemical Society and the use of the new "modern" airplane would aid their experiments into "scientific" acceptance of their theories.¹ The rainmakers of the plains, however, appeared to come from the ranks of everyday people such as lawyers, druggists, realtors, ranchers, and salesmen. Many of these rainmakers had traits in common. Similar

¹ Spence, 132.

to purveyors of quack medicine arts, rainmakers were men of magnetic personalities and profound students of human nature. They knew a strong claim was more convincing than a weak one - especially if neither could be proved. Arriving at a drought-stricken area, they used their fanfare to convince farmers and ranchers to spend money in desperation. Unquestionably, many people believed that they had little to lose by hiring a rainmaker, like Jewell, on a "no rain, no pay" basis, and at least they were doing *something* to help end the drought.

Most rainmakers never lasted very long. Occasionally one died on the job. James Boze was killed in 1934 while testing his "moisture bombs" in the air over Waxahachie, Texas. Melbourne's career was limited to a few short years. Dyrenforth fell into obscurity immediately after his highly publicized experiment. William Swisher retired his "black box" and his earthenware crocks early when he "got religion" and began to worry about his intervention with the divine.²

Charles Hatfield is the notable exception to the rainmakers of the Great Plains. Of all in his profession, he was the most durable, spanning a generation of successful rainmaking demonstrations. Hatfield's presence in southern and central California prior to the introduction of low cost water by irrigation gave hope to the local farmers and ranchers. Through his presentation of claims that he could "enhance-moisture" prior to starting his demonstrations, he sought to prove that his methods were scientific in that, given the correct atmospheric conditions, the

²Halacy, 55-66; Louis Pound, "Nebraska Rain Lore and Rain Making," *California Folklore Quarterly* 5, (April 1946), 141; Spence, 137.

experiments could be repeated over and over with success. The public believed in "Professor" Hatfield as they did in the Wright Brothers and Henry Ford as self-educated in the profession of their choice in the "age of progress."

Charles Hatfield, raised in Fort Scott, Kansas and moving to the semiarid Los Angeles area in the worst years of drought, watched his father's farm go to ruins. Following in his father's footsteps, Hatfield became a sewing machine agent trained to be honest, pragmatic and professional. Hatfield dedicated himself to the science of meteorology, weather forecasting and chemical experimentation five years before launching on a career in rainmaking. Before his first successful public demonstration in 1904, he performed "sixteen successful experiments with only one failure." Over the next twenty-seven years Charles Hatfield would complete thirty successful rainmaking contracts, mostly with local farmers and ranchers in the semiarid areas of central and southern California.

Most of the Great Plains rainmakers operated with circus fanfare, explosives, colored gases and boisterously announcing their presence. Hatfield, however, retreated to the hills in isolation, protecting his "moisture-enhancing" process from would-be intruders. Charles Hatfield and his brothers conducted themselves as professionals, smartly dressed and well presented in almost a "dandy" sort-of-way. Charles gave several lectures being careful to not reveal his secrets. Though his writings, letters and essays it is obvious Hatfield was well-educated and able to speak intelligently on the subject of weather in a quiet, self-assuring and confident manner.

Charles Hatfield introduced the concept of a contract to the profession of

rainmaking thereby implying a mutual obligation of services to be rendered before payment. Of course, a "no-rain, no-pay" guarantee is attractive, but Hatfield felt he had a reliable system of producing results. Although his first "rain-contract" was for only \$50, he noticed very soon that amounts of \$10,000 for producing rain in a season or \$4,000 per inch of rain for one demonstration was acceptable to farmers and ranchers, especially in years of drought. His contracts became more complicated as he dealt with corporations and city governments, such as the City of San Diego. Hatfield's contracts with the farmers, however, were simple, direct and easy to understand. Obviously, his eight contracts from 1905 to 1924 with the wheat farmers at Crow's Landing are a testimony to his repeated success.

In addition, Hatfield had repeat business in Altadena; with farmers near Coalinga in the San Joaquin Valley; and the Honduras banana growers (once for putting out a fire and another for ending a drought). Until low-cost irrigation water could be delivered to the farmers and ranchers, Hatfield could be depended upon to deliver rain. Throughout his career, Hatfield always noted that the farmers and ranchers come first when his demonstrations are needed and that his costs for services can be tailored to their needs. The only contract not to be honored was for \$10,000 with the City of San Diego.

Up to the end of his life, Hatfield continued to refute the title of "rainmaker" and instead referred to his methods as "moisture-enhancing." For Charles Hatfield, his "moisture-enhancing" demonstrations happened regularly; but not as spectacular as his activities at Morena Reservoir in 1916 and Sand Canyon near Randsburg in 1922. Never collecting from his San Diego contract in

1916, Charles Hatfield became the first rainmaker to file a lawsuit for non-payment of services. Hatfield's suit against the city lingered on the court calendar for nearly twenty-two years and was finally dismissed in 1938 for lack of prosecution. Charles Hatfield, to be sure, would have welcomed a lawsuit in which judge or jury found him responsible for producing rain, but even in more recent times such decisions have not been forthcoming, such as in the 1955 Yuba City case. Even though Hatfield did not consider himself a rainmaker, rainmaking activities simply do not fit easily into the legal framework of the country. The State of California in 1965 introduced the first law dealing with weather modification. The law required that rainmakers explain their process, including the use of intended materials and methods, declare the area over which the weather will be modified, and receive permission from the state prior to starting operations.

Rainmakers were always newsworthy. Hatfield's correspondence show direct links between inquiries by possible clients world-wide, and articles about him in the national and foreign press. Spanning almost forty years of rainmaking activities, Hatfield continued to promote catchy headlines, talk shows and movie productions. Unfortunately, it was the press, especially the early newspaper accounts, that transcend the magical mythology of the plains rainmakers into Hatfield's life. Hatfield struggled throughout his career to promote his experimental demonstrations as scientific. Obviously, his outstanding record of rainmaking demonstrations helped feed the reporter's frenzy and sold newspapers. And, prior to radio in the 1930s and television in the 1950s, there was no other

way to receive wide coverage for Hatfield's demonstrations.

Hatfield believed he "had something" and that his twenty-foot high towers, flat pans with evaporating chemicals, and locating his demonstrations next to bodies of water actually changed atmospheric conditions. The methods that Hatfield used were consistent and secret. Hatfield's earlier studies of meteorology, his knowledge of almanacs and tapping into the Weather Bureau weather data coupled with his keen sense of forecasting, greatly increased his odds for successful demonstrations. Based upon the premise that the chances for rain increased as a drought deepened, Hatfield's timing was impeccable and his demonstrations at rainmaking remarkable.

Most of his contracts were written for his demonstrations to be performed during the entire rainy season; approximately four to five months, for a total amount of rainfall as measured in inches. As each successful rain-making attempt brought a few inches, Charles Hatfield was quick to contact the press for announcement the following day. In many cases, he reached his quotas well in advance of his contractual time restraints. Hatfield never contested the amount of rain that fell in a season, leaving those computations to the Weather Bureau. As time progressed, his contracts became more lucrative, at one time awarding him \$8000 for two inches of rain. Careful to avoid the real arid desert country, Hatfield practiced where there was always a reasonable chance of rain to occur. Throughout his career he confirmed that there must be moisture in the air for his demonstrations to be successful. Potential customers in Imperial Valley, Anza-Borrego Desert, Tunisia (north Africa), Arizona and other extremely arid areas

requested Hatfield's talents but were refused politely or never answered.

Did Charles Hatfield really create rain? His chemical formulas are lost along with his detailed diaries of his demonstrations. Therefore, his experiments cannot be "scientifically analyzed by an impartial party." The formulas and diaries, however, are not important because the contributions Charles Hatfield made through his exemplary demonstrations had convinced the public he was a scientist. He even offered to sell his formula to the Forestry Bureau, Department of Agriculture, but the offer was ignored.

Charles Hatfield, under constant duress from the U.S. Weather Bureau, held his course to convince local farmers and ranchers that he had a service they needed and it was available at a low cost. Hatfield believed that he was helping the settlement of semiarid areas of central and southern California through his scientific rainmaking demonstrations. The public believed that, through Hatfield's success, weather modification by man could be a reality and not some form of "hocus-pocus" mythical rainmaking stunt of the 1890s. By 1946 the scientific community obtained "success" with weather modification experiments and in 1965 the State of California regulated the licensing of rainmakers.

By the time low-cost irrigated water was made available to local farmers and ranchers in the late 1930s Charles Hatfield and his mysterious wooden towers and "rain-enhancing" chemicals were no longer needed. Charles Hatfield had fulfilled his calling for the preservation of the small agriculture and ranching communities of central and southern California.

Another plaque, mounted on the new rock monument, located at a more

prominent location near the turnoff to the camping facilities at Morena Reservoir, was rededicated to Charles Mallory Hatfield by the Native Sons of the Golden West on April 12, 1987 and again, simply states:

HATFIELD THE RAINMAKER

Charles M. Hatfield offered to fill Lake Morena to overflowing for \$10,000. To avert a serious water shortage the City of San Diego voted to accept his offer, but failed to sign the contract. In early January 1916 Hatfield and brother Paul erected towers east of Morena Dam and began releasing chemicals. On January 14 rain began falling totaling 35 inches. On January 27 lower Otay Dam burst and a wing of Sweetwater Dam broke. The flood caused damage over \$3½ million. San Diego refused to pay Hatfield declaring the rain "an act of God" Hatfield filed a law suit to no avail. He quietly left the area.³

³Personal visitation to the site by the author, September 6, 1998. The original 1973 plaque language that was omitted from the 1987 plaque was the following: "Agreement with the City..." "Rain fell continuously..." "Along with 15 lives lost..." "Forcing Hatfield to flee the country..." Hatfield's brother Paul was given recognition although it was actually Joel that assisted in the demonstration at Morena Reservoir. Both the 1973 and 1987 plaques note that the city (San Diego) declared the rain "an act of God." The city in the lawsuit referred to the incident as "due entirely to the elements of nature."

APPENDIX A

THE SEARCH FOR HATFIELD'S SECRET FORMULA

The secret "moisture-enhancing" formula of Charles Hatfield appears lost for now. There are two references made to his formulas and methods. Charles Hatfield was quoted in 1952: "The height of the towers is not essential, except that they must be off the ground. I thought it possible by surcharging the atmosphere with forces potent and powerful enough, and bearing upon conditions already working, that the influence so liberated would be able to induce rainfall. The forces set in motion from these operations never concentrate over a local territory, but extend over large areas. That is where my system is more practical than the use of explosives, or the sprinkling of crystals to create rain over but a limited area, and clouds must be present. Nature herself is responsible for 99 percent of the influences used to promote rainfall. My operations might be said only to cause the turning of the scale."¹ In 1963 Paul Hatfield noted: "The atmosphere holds vast stores of moisture, even in the driest sections, and when no visible clouds are in sight, the air holds and is charged with moisture ranging from 10 to 50 percent. It is this moisture that the operations work upon, which by

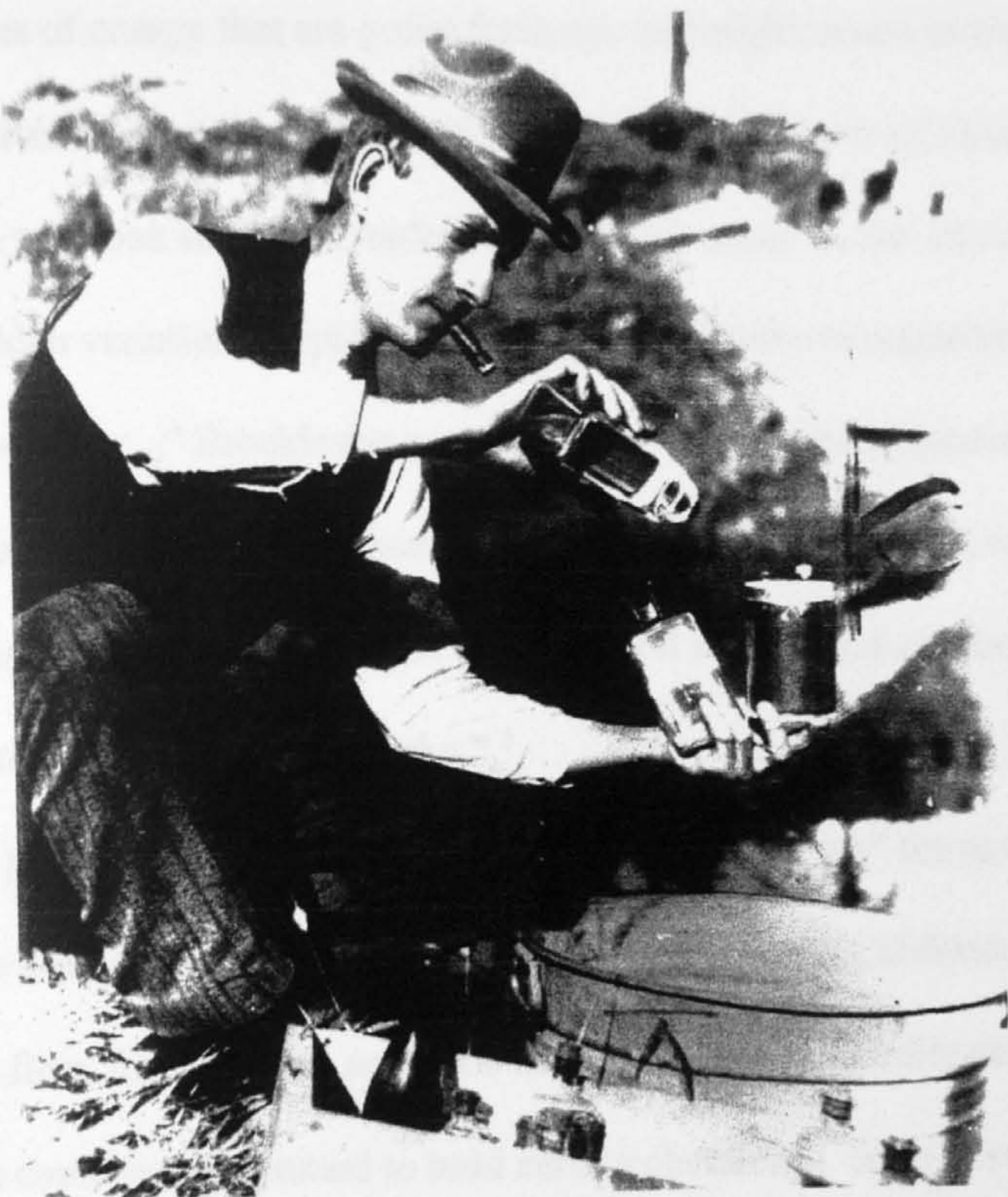
¹ *Morton County Progress* (Elkhart, Kansas,), June 27, 1952.

Figure 29

Charles Hatfield with Chemicals, 1916.
Charles Hatfield pouring chemicals as a publicity stunt. Photo courtesy of the
San Diego Historical Society, 81:9775, 1916.

Figure 30

Charles Hatfield with Chemicals, 1917.
The photo had the caption "Mr. Hatfield doesn't like to be called a rain-maker.
He says he only persuades the moisture aloft to come on down."
Photograph by Charles Alma Byers. Charles Alma Byers, "The Man the Rain
Minds," *Everybody's Magazine* 41, August 1919.



constant forces of energy that are going forth day and night, result in rain.”² This quotation by Paul is reminiscent of John Brocklesby’s *Elements of Meteorology* dated 1860, a textbook used by Charles. Brocklesby notes: “...the sky is subject to great and sudden variations; rapidly changing from positive to negative, and back again, night and day...” Brocklesby goes on to say “...Now it is supposed, that, at times, the humidity of the atmosphere is condensed at once into rain, without passing through the intermediate state of cloud; and under these circumstances a shower might fall from a cloudless sky.”³

Two photographs showing Hatfield “mixing chemicals” for newspaper articles were sent to Greenwood and Associates, a renowned California archaeology firm, for review to see if the bottles that were carefully staged in the photographs could be determined to hold certain chemicals. John Foster, an associate wrote back after reviewing the photos: “We have looked over your photos, including our bottle expert Paul Hampson, and cannot provide an opinion as to their contents.”⁴

Roger Chalberg, a park ranger at the San Diego John Lyons Lake Morena

² *Daily Enterprise* (Riverside, California), September 28, 1963.

³ Brocklesby, 133, 85.

⁴ John Foster, Archaeologist, personal interview by author, telephone conversation November 24, 1998 and July 8, 1999, San Diego. Followed by Email correspondence. The correspondence continued: “The bottles are simply too generic and lacking any indication of bottle color there is no way to determine what may have been in them. There is also the possibility that Hatfield might have intentionally mislabeled his bottles to throw off ‘competition.’ But that’s a wild guess. I would think your best chance would be to find his personal notes or invoices or something like that. I assume they don’t exist. You might also look at tax records for him and see if they list any chemicals in his possession. I think that’s a wild shot too, but you never know. Sorry we couldn’t be of more help, its an interesting subject. John.”

County Park and past president of the Mountain Empire Historical Society, said that Hatfield used ammonia chloride as his main ingredient.⁵ Hatfield was reported to use twenty-three different chemicals and in a publicity photograph, dated 1919, there can be seen thirteen or fourteen different chemical bottles. One bottle is labeled sodium nitrate. All of the bottles are turned slightly, so only portions of the labels can be seen and are not distinguishable.⁶

Jack Vargo, also a park ranger at John Lyons Lake Morena County Park, claims that Hatfield's main chemical was sodium nitrate. Jack Vargo and another gentlemen, Jim Clark, experimented with evaporating pans using their own formula on January 16, 1991 (seventy-fifth anniversary of the 1916 flood) at Lake Henshaw and they produced rain. Jack Vargo would not divulge the combination of chemicals he used at Lake Henshaw.⁷

Jane Selvar, San Diego Central Public Library, allowed an examination of Hatfield's instruments.⁸ The instruments were given to the library by Paul Hatfield and are in good condition. There is a copper vessel, badly stained from chemicals, used by Charles Hatfield to measure his chemicals. In an attempt to find a lab to test the materials, there was great anxiety in being "professionally" involved in such an experiment. The tests, if conducted, could be too destructive

⁵ Roger Chalberg, personal interview by the author, telephone conversation, June 7, 1999.

⁶ San Diego Historical Society photograph 86:15807. Photograph dated 1916. David Hatfield when shown the photograph with the bottle labels turned slightly out of view, commented "Oh, really?" (with tongue-in-cheek). October 30, 1999.

⁷ Jack Vargo, personal interview by the author, telephone conversation, June 15, 1999.

⁸ Jane Selvar, personal visitation to the San Diego Central Public Library, to view the collection of the Hatfield instruments on January 8, 1999.

on the vessel since the test must penetrate the copper to verify presence of the chemicals.⁹

So, for now, the Hatfield formula remains unknown.

Tom Owens Hatfield Collection. Tom Owens is curator of the Rare Books Collection, Los Angeles Central Public Library. The documents on Hatfield were collected by his father.

"Droughts." Clippings, vol. 1, 1888-1953, Kansas State Historical Society, Topeka, Kansas.

Hatfield, Abraham. Personal journal of Abraham Hatfield, *The Hatfields of Westchester*. The journal contains the descendants of Thomas Hatfield of New Amsterdam whose sons settled in White Plains, Westchester County, New York. The last entry in the journal is dated 1935. David Hatfield Collection.

Hatfield, Charles. Scrapbooks vol. 1 and vol. 2, along with loose clippings, letters and other miscellaneous documents, Rare Books Collection, Los Angeles Central Public Library.

Camp, Rollin C., *Fort Scott Directory 1875*. Fort Scott, Kansas: Monitor Steam Publishing House, 1875.

Chat. *M. Hatfield v. City of San Diego*, Superior Court Records, Older Record Section. Civil Case No. 26602 filed December 1916. Microfilm: Old Civil and Criminal OCC 623 26568 - 26626, San Diego.

David Hatfield Collection. Personal collection of Hatfield memorabilia, personal letters and photographs. David Hatfield is Paul Hatfield's son.

Hatfield "Rainmaking Instruments," Special Collections and the Hatfield Collection, California Room, San Diego Central Public Library.

Hatfield, Marie. Personal autograph album. Marie Hatfield was Charles

⁹ Contacts were made with the following testing laboratories to verify the chemical stains on a copper vessel: Ted Crumb, Testing Engineers, 7895 Convoy Court, Suite 18, San Diego, CA 92111. Telephone (619) 225-9641. Mr. Crumb noted in a personal conversation with the author on May 24, 1999 that he would prefer not to perform this test after being told it was for rainmaking equipment used by Charles Hatfield. Mr. Crumb suggested that the author call National Testing Laboratories in Anaheim, CA. Louis West, National Testing Laboratories, 877 So. Rose Place, Anaheim, CA 92505. Telephone (714) 991-5520 was contacted on May 26, 1999. Mr. West complained violently that he does not believe in rainmakers of the late nineteenth century and would not like to have his name associated with such an investigation. "It's simply not professional," he said. Mr. West also noted the test would be too invasive and destructive on the copper vessel.