George William Beattie, Origin and Early Development of Water Rights in the East San Bernardino Valley (San Bernardino Valley Water Conservation District Redlands, California, Bulletin Number 4) supplemented by Horace P. Hinckley and Jeffrey J. Prendergast and Edward Fitzgerald Dibble, November 1951

In writing the early history of rights to Santa Ana River water as they developed in the eastern part of the San Bernardino Valley, it seems desirable first to describe the beginnings of irrigation in the Valley from that stream. Much of the information in the following pages has been obtained from testimony in lawsuits and from records in the San Bernardino County courthouse; but the memory of the writer also suffices for much, since he lived in the Valley and was more or less in touch with the different irrigation systems, not from the very beginning of all of them, to be sure, but as far back as the year 1874.

A short time prior to 1856, while the Valley was occupied by a Mormon colony, a community developed along the north bank of the Santa Ana River about three miles southeast of the town of San Bernardino approximately between what are now Waterman and Tippecanoe Avenues, 1 [Hewitt vs. Story. Testimony R. L. DeWitt, pp. 573 et seq.] a community known as the Timber Settlement because of the many large cottonwood trees growing there. Much of the land was moist or semi-moist, and pasture grasses, fruit trees, grapevines, and other deep-rooted plants grew there without irrigation. However, corn, garden vegetables, and other surface-growing crops usually needed artificial watering.

Not far to the north was another community, known as the City Creek Settlement, lying along the eastern extension of what is now San Bernardino's Sixth Street approximately between Waterman and Sterling Avenues.2 [Ibid.] Natural conditions here, were similar to those in the Timber Settlement, permanent planting being largely independent of irrigation while summer crops required it.

The year 1856 was very dry, and in May the people of the two settlements united to utilize the water in the Santa Ana River for the benefit of their summer crops. They formed a sort of mutual water association, appropriated the flow of the river under the provisions of the California law, built a dam in the stream about eight miles below the mouth of Santa Ana Canyon and about two and a half miles east of the present Tippecanoe Avenue. From this dam they constructed a ditch large enough to carry the ordinary summer flow of the river to their lands. R. L. (Rube) DeWitt was in charge of the work. About half a mile below the dam the ditch forked. The main branch continued to the Timber Settlement and was known as the Timber, or South Fork, Ditch of the Santa Ana. The other branch led to the City Creek Settlement and was called the North Fork Ditch of the Santa Ana.3 [Ibid.] In order to prevent possible confusion, these two ditches will be referred to hereafter in this paper as the Timber Ditch and the North Fork Ditch. Both, it will be remembered, were on the north side of the river.

There seem to be no official records showing how the water rights of the original owners of these ditches were determined. Indeed, they were of no importance to anyone else. Little did men dream of the enormous value that would be attached to them in days to come. They were regarded as belonging in some way to the land irrigated, and it was a good many years before they were counted as property that could be transferred by a separate deed or bill of sale. Not till 1872 did an instrument purporting to grant a water right in the Timber Ditch without an accompanying land transfer appear in the books of the county recorder. Prior to that time, a transfer had been covered by the phrase "together with all and singular the tenements, hereditaments and appurtenances thereto belonging" in the deed to the land sold.4 [Ibid. pp. 981 et seq.]

In 1864, however, only eight years after the taking of water from the Santa Ana River started, records of ditches appeared in the books of the San Bernardino County Water Commissioners; and from then on as long as the original water rights were attached to the Timber Ditch, the Commission records showed year by year the number of acres of land each owner in the ditch was authorized to irrigate. When he irrigated he used the entire flow of the ditch. Apparently a grower submitted an estimate every year of the amount of land he would like to

utilize, and a neighborhood agreement determined the part of the total estimated acreage that would be allotted to him. 5 [Ibid. pp. 923 et seq.] This allotment determined the length of time he would be entitled to the water in the ditch.

According to the Water Commission books, the acreage irrigated from the Timber Ditch increased steadily until 1872, as follows: 1864 242 acres; 1865, 295 acres; 1866, 298 acres; 1868, 325 acres; 1871, 363 acres; and 1872, 369 acres. 6 [Ibid. Citing Water Commission Minutes.] The number of acres irrigated in 1872 was the greatest number supplied with water up to that time; and from then on, with the exception of the year 1873, 369 was held to be the number of shares in it. Each share became known as an "acre water right", and entitled the owner to use the entire flow of the ditch 1/369 of the time. In 1873 the acreage to be irrigated was only 368, and an effort was made to make 1/368 the permanent water allotraent per acre. The effort apparently failed, for when in time the Timber Ditch was abandoned, 369 acre rights, or shares, were transferred to another locality.7 [Ibid. pp. 934; 947 and 948.] How the City Creek people managed their irrigations does not appear. It may have been in much the same manner.

Presumably some such system as this just described was in use from the very beginning among the Timber settlers, conditions determining each season what an individual farmer's planting would be. The capital invested in the construction of the ditch was so small that no one could justly feel aggrieved if allowed water for a slightly smaller acreage than he had irrigated the year before. Rube DeWitt, who had been in charge of construction of the ditches, stated on a witness stand in the 1880's (in the suit, Hewitt vs. Story) that they were built with no professional engineering assistance. The course from the dam was laid out approximately with a carpenter's level, and the grade was tested with a stream of water. A slight ridge that crossed the line of the ditch was cut through with a horse-drawn scraper, and most of the channel was excavated by oxen dragging up and down the length of it a "crowder" made from a large cottonwood tree with a fork in it. All this shows that the initial cost in money must have been slight. 8 [Ibid. p. 576.]

Two other ditches were started at about this time. In the fall of 1856, a few months after the Timber and North Fork Ditches went into operation, Nathan C. Tenney, a Mormon bishop supervising farm work for his people on the old mission lands west of what is now Redlands, built a ditch to convey Santa Ana River water to them. From his dam in the river bed the water ran to a point about half a mile below the Santa Fe railroad bridge of today, and then left the wash to enter the ditch he had dug on a regular grade across the mesa, flowing in it to the vicinity of what is now Orange Street in Redlands between Colton and Lugonia Avenues. There it entered an arroyo that led from the Mill Creek Zanja on through land now occupied by the University of Redlands, and ran to the land he was farming. This arroyo received surplus water from the zanja in the Crafton region, and on a map filed in litigation over Mill Creek water in 1876 was designated as "Indian Ditch".

The Tenney dam and "intake" was several miles above that of the Timber-City Creek settlers, and when in use it deprived them of their water. They protested promptly to the Water Commissioners, and that body ordered Bishop Tenney to desist from further activities along that line. He obeyed, and made no further use of the ditch, which lay idle for several years until it came into use under new arrangements and a new name, as will be seen. 9 [Ibid. p. 584-85.]

As to the other new ditch, in 1858 Lewis F,. Cram and his brothers, and Frederick Van Leuven and his sons, joined in digging a ditch from the mouth of Santa Ana Canyon to their lands at the base of what is today known as the East Highlands bench, or mesa, and began drawing on the river water. 10 [Ibid. pp. 1492-96. DeWitt et al. vs. Van Lueven et al.] The ditch ended east of City Creek wash, approximately on what is now East Third Street. What arrangements, if any, were made with the owners of the Timber and North Fork Ditches is not known. That protests against their action were made seems certain from the assertion by Mrs. Lucy Janney, once

a daughter-in-law of Frederick Van Leuven, to the effect that she remembered seeing him stand over the intake of the Cram & Van Leuven Ditch with a gun to ward off Timber or City Creek settlers attempting to prevent the diversion of water from them. Van Leuven's action in this case was drastic, but not unusual. People in those days did not always wait for settlement of grievances by pacific means or by the courts.

It was, however, hardly reasonable for the Timber and City Creek people to expect an exclusive right to the river water from the canyon mouth, especially under the wasteful conditions then prevailing, even though the water commissioners had upheld the Timber Ditch owners in their fight against the Tenney Ditch only a short time before. The water in the river diminished steadily in the run down through the Valley, and the Timber-City Creek settlers never received anything like the amount of water that issued from the canyon. But any diversion at the canyon mouth made the amount they would receive just so much less.

More serious opposition to the taking of water from the river into the Cram & Van Leuven Ditch did develop in time, and in August, 1860, suit was brought against the builders of that waterway by a majority of the owners of the Timber Ditch. Damages were sought. The Cram & Van Leuven people replied that "they were acting within their legal rights". Californians were permitted by law to appropriate water from non-navigable streams or springs under certain conditions. At the mouth of the canyon where the Cram & Van Leuven people started their ditch the river flow was naturally at its maximum, and there was an amount of water running below and away f rom their intake much greater than any flow that ever reached the Timber Settlement. A ditch to conserve the water lost in the open river channel between this intake and the intake of the Timber people eight miles below would have solved the Timber water problem, even after the Cram & Van Leuven withdrawals. It was unfair and unreasonable to demand that all water from the canyon be left to flow down the river in order that the Timber settlers be saved from extra trouble.

The suit never came to trial and there must have been conferences between the parties interested in which common-sense arguments were advanced, for in June, 1861, judgment by consent was rendered, recognizing the right of the Cram & Van Leuven Ditch owners to 1/6 of the flow of the river at the canyon mouth. The rights in this ditch were the first water rights in the Upper Santa Ana River to be adjudicated by the courts. 11 [Ibid.]

There seem to be no official records showing how the waters of the Santa Ana River had been divided originally between the Timber and the North Fork Ditch. According to the testimony of Mr. DeWitt in the suit already mentioned, 2/3 of the entire stream taken from the river was allotted to the Timber Ditch and 1/3 to the North Fork. 12 [Ibid. p. 598.] When the Cram & Van Leuven Ditch began carrying water, the flow in the Timber and North Fork Ditches would have been diminished proportionately. If Mr. DeWitt's assertion is correct, one may assume that after 1861, when the court awarded 1/6 of the river flow at the canyon mouth to the Cram & Van Leuven Ditch, the Timber people were logical in their contention that they were entitled to 2/3 of 5/6, or 5/9, of the river. The Water Commission evidently felt'so, for on May 29, 1872, they issued an order that the river flow be so divided.

The North Fork people were dissatified with this action. They claimed 1/2 of the river. They were interested in maintaining their water rights for actual use, whereas the Timber Ditch owners were by that time thinking mainly of selling, as will be seen later in this paper. The North Fork people were the more aggressive in pressing their claims, and their wishes were finally allowed, by tacit consent. Under date of June 12, 1879, the minutes of the Water Commission say:

“A dispute arose between- the parties of the North and South Fork [Timber] owners with regard to the quantity each ditch claimed. The North Fork claiming 1/2 and the South Fork 5/9 of the water, and we made an equal divide, giving each 1/2, when the owners of the South protested against the division, and claimed the division under the records of May 29, 1872, and we left the matter unsettled.” 13 [Ibid. pp. 948-49. (Water Commission Minutes, Book C, p. 103).]

Although the commissioners very properly left the settlement of the legal side of these conflicting claims to the courts, their division of the stream equally between the two ditches was unquestioned from that time on. In the practical distribution of the water, each owner used the entire flow of the ditch for his proportionate part of the “period of rotation” agreed upon by the settlers. This period varied. It might be every seven days, every ten days, every two weeks, or any other period desirable. The farmers on the North Fork Ditch, in the City Creek section, adopted a rotation term of ten days as the period during which each share was having a right to the flow of the North Fork Ditch one hour in every ten days. The right was known as an “hour water right” in that ditch. This meant a right to 1/240 of the flow of the ditch every ten days, since ten days equalled 240 hours. (Personal knowledge of G. W. B.)

The years 1862 and 1867 brought serious troubles to the Valley in the form of disastrous floods. Prior to the one of 1862, the Santa Ana River apparently flowed in a well-defined, rather narrow channel bordered by alders, cottonwoods, sycamores, and willows. Trees also flourished on land adjacent that was moistened by seepage. The map filed in 1841 by the Lugos with their application for a grant of the Valley from the Mexican government designated this stretch along the river as the monte, a Spanish term equivalent to our English forest or wooded land. The city of El Monte near Los Angeles is so named because of its having been founded in what was then a moist, wooded region.

Mr. J. J. Prendergast, President of the Bear Valley Mutual Water Company, says that “Uncle Billy” Singleton, who came to the Valley in 1857, told him that the river bottom between the Redlands and East Highlands of today was then known as “the willow forest”, that it was well timbered in places, the river meandering through it in channels, and that the land provided excellent pasturage. He added that the flood of 1862 took out most of this growth, leaving little but sand and boulders, and what that flood left the one in 1868 (really the last days of December, 1867) finished.

R. L. DeWitt confirms Singleton’s statement in his testimony in court when he said, “The river then before the flood (of 1862) was in good condition. It was not like it is now, all tore up. It run in channels pretty well guarded with willows and alders and such like. It was not wide like it is now.”

In connection with the Singleton statement, Mr. Prendergast remarks that the heavy tree growth along the Santa Ana in the 1860’s would explain why a locality so far west as Sterling Avenue could then have an adequate supply of irrigation water from the river in the summer time. In an average season today, he says, the flow in the river would not reach that point after May 15 except in especially wet years, even were there no water diversion above.

Changes in the river bed occasioned by the flood of 1862 materially affected the volume of water reaching the Timber-North Fork ditch head. The greatly increased seepage resulting from the breaking up of former puddled channels and the consequent spreading of the water through the gravel and boulders caused the loss of much of the flow. With the Cram & Van Leuven diversion in addition, irrigators in the Timber settlement could no longer

depend upon an adequate supply of water in the summer months, when they especially needed it. The value of Timber water rights suffered, and it was then that discouraged owners began to think of selling them.

The City Creek settlers naturally suffered also from a shortage of water in these summer months, and finally many of them disposed of their water shares, a large portion of which went to persons occupying lands farther east, between Sterling Avenue and Harlem Springs. The prices at which these shares sold were very low.

The flood of 1862 had cut a new channel for the river some distance north of the head of the Timber-North Fork Ditch, making a new intake necessary. The North Fork people found that it would be advantageous to them to turn their water out a little above the new intake, and they did so, digging a stretch of ditch to connect with their line below. The Timber and North Fork Ditches were entirely separate thereafter. 14 [Ibid. Testimony DeWitt, p. 581; testimony L. F. Cram, p. 829-830.] The North Fork owners soon decided that they could secure more water for themselves by carrying it in a ditch all the way from the canyon instead of allowing so much of it to waste away in the river bed. In 1865, therefore, they asked permission of the Cram & Van Leuven Ditch owners to enlarge that waterway and run their North Fork water through it, 15. [Ibid. Testimony D. R. Dickey, pp. 838-842.] is offering to do the enlarging and pay their, share of the operating expenses thereafter. Among themselves they arranged to take turns in using their water for twenty-four-hour periods every ten days. How they had taken their water before is not known. This was the first instance of organized action among them of which we have documentary record.

The Cram & Van Leuven Ditch owners granted the request, since there would be a distinct advantage in having a larger stream, flowing in their canal. Much of it was bordered with alder and cottonwood trees which drew heavily on it for moisture, and the water lost through this and through seepage and evaporation would be shared thereafter by more persons. The ditch was enlarged, and the North Fork people dug a channel from the lower end of it to their lands. From that time, the North Fork and Cram & Van Leuven waters have been taken from the canyon mouth in a ditch used in common.

The action of the North Fork people in diverting their water at the mouth of the canyon was clearly detrimental to the Timber Ditch owners, since the loss by seepage and evaporation in the river bed from the canyon to their intake more than eight miles below, now fell on 1/2 of the river flow instead of on the entire flow as in 1856, when the original ditch was built, or on 5/6 of the stream as in 1858, when the Cram & Van Leuven Ditch was constructed. On several hot days the water either failed to reach the Timber Settlement at all, or reached it in such diminished quantities that crops there could not be irrigated. In certain dry years arrangements were made with the Cram,& Van Leuven-North Fork people whereby all the water of the river was turned into their ditch f or a given time, and then f or an equal time was allowed to flow down to the Timber Ditch intake. But even this neighborly co-operation failed to save the crops in the Timber settlement in those years. 16 [Ibid. pp. 579-580; p. 606.] It is not surprising that the Timber settlers became alarmed about their future. Delegations of owners of the two ditches began meeting with the county water commissioners at the mouth of the canyon each year after the high water of the winter season subsided, to apportion the river water as fairly as possible between the two waterways for the coming irrigation season. The flow was divided with scrupulous care.

~, In the meantime, during the winter of 1867-68, Berry Roberts and E. H. Thomas acquired possessory claims to one hundred and sixty acres each of public land in or adjacent to the northwest part of what is now Redlands, about where Pioneer and Tennessee Streets meet. Roberts moved his family onto his tract, but Thomas planned merely to farm his land and maintain his home in the Timber Settlement. In order to get water for domestic use and to irrigate for winter grain and spring gardens, the two inen began construction from the river of a waterway that came to be known as the Berry Roberts Ditch. They knew that the Timber settlers, several miles on, had prior rights in the water of the river, but their plan was to use any ~flow in excess of the capacity of the Timber

Ditch. Their intake was about half a mile above the point where the Santa Fé railroad crosses the river bed today, some two miles below the mouth of Santa Ana Canyon, and about six miles above the intake of the Timber Ditch.

They ran their water to the south edge of the wash in one of the channels left by the recent flood, and there turned it into the longidle Tenney Ditch,17 [Ibid. pp. 78-79. Testimony Berry Roberts et al.; testimony J. B. Glover.] in which it ran across the mesa for nearly two miles to a point about where Pioneer and Church Streets now meet. This Tenney Ditch had been well built, on a regular grade, but it had not been cleaned for years and had become small in capacity. The river bed was so changed by the floods of the 1860's that it is impossible now to say just where the Tenney canal started and where it ran prior to reaching the mesa, but its intake and that ofthe Berry Roberts Ditch were probably not far apart.

From a point on the Tenney line near what is now Pioneer Street, Roberts and Thomas worked out a rude water channel, probably little more than a plowed furrow, and through this the water ran a mile to reach Thomas' land, and half a mile farther to that of Roberts. As Roberts testified in a water suit years later, he and Thomas made no attempt to complete their ditch that year, but merely put it in shape, as quickly as possible to carry a small stream of water.

On March 10, 1869, Roberts notified the county water commissioners that he was claiming a right to the surplus flow of the Santa Ana; that is, to the water beyond what was required to supply the Cram & Van Leuven, the North Fork, and the Timber or South Fork Ditch. 18 [Ibid. P. 928. (Water Commission Records, Book A, p. 3).] The shareholders in that ditch seem to have made no particular objections, as they used the river flow mainly for summer crops, and the Berry Roberts group would be using it at a time when they would not need it. The commissioners seem to have taken no action on Roberts' claim at this time.

A waste water right in a running stream was understood to be a right to divert and use any water from the stream that was in excess of what might justly be claimed under a prior right. A water flow of this sort was naturally inconstant and unpredictable in quantity, and rights to it opened the way for conflicts in ownership. Water commissioners were reluctant to recognize such rights. In 1867, two years before, W. W. McCoy, living on land he owned in what is now Crafton, had sought a right to waste water in the Mill Creek flow that he had been using, and had been refused. The claim was, however, allowed later.

The crude ditch that Roberts and Thomas made from Church Street on gave them endless trouble. The grade was steep, and the water cut right and left and carried large quantities of sand. Thomas planted eight or ten acres of corn that year, but could not mature a crop. The trouble was not a lack of water in the river, for the winter of 1867-68 was one of heavy flood and the water surplus must have been great. His failure must have been due to the inadequacy of the ditch. He became disheartened and sold his land and his water claim to August Starke, proprietor of a hotel in San Bernardino. Testifying in regard to the matter, he said, "I put it (the land) in to corn, and gave it away; quit it, quit the ditch and all." There is nothing to indicate that Starke ever cultivated the land.

Meanwhile, Henry Suverkrup, a Dutch lumberman in the San Bernardino Mountains, entered a claim to 160 acres of land adjoining Roberts' and Starke's claim on the south. He acquired it merely as a speculation and never lived on it, but Starke and Roberts gave him an interest in the ditch and a share in the water. Such a proceeding illustrates the informality existing between neighbors in those days, and shows that the value they set upon their holdings could not have been high. During testimony regarding this transaction, Mr. Roberts said: "After Mr. Thomas sold to Mr. Starke, then Mr. Starke and myself gave to Suverkrup a third interest in the ditch. The ditch belonged to Mr. Thomas and me, well, I suppose, equally." He continued: "Mr. Starke and Suverkrup seemed to be very good friends, and I felt that I was a good friend of SuVerkrup too. Mr. Starke made

a proposition that we take in Suverkrup, give him a share in the water, and they pay me twenty dollars apiece ... to enlarge the ditch". Roberts added that he had done most of the work on the ditch up to that time. The money was paid. Apparently no papers were passed in the transaction; there was merely the verbal agreement. In other words, Suverkrup obtained the share in the ditch and the water for twenty dollars. Stark disposed of his land and the water claims to George A. Craw some time in 1869, apparently not long afterward.

Thus far, no official recognition or record of the Berry Roberts Ditch and its water rights had been secured, but an entry in the water commission books shows that on February 10, 1870, on request of Henry Suverkrup, Berry Roberts, and G. A. Craw, the board "located". a water ditch to be known as the Berry Roberts Ditch. The entry proceeds: "The water claimed by the aforesaid parties, for this ditch, is the waste water of the Santa Ana River ... to be used for irrigation purposes, and to be apportioned equally among said parties." 19 [Ibid. p. 929. (Water Commission Records, Book B, pp. 9-10).] Roberts was appointed overseer of the ditch for the current year. In this action of the board, Roberts' claim of March 10 in the preceding year seems to have been ignored.

As has been said previously, the ditch was practically the old Tenney Ditch from the point where that waterway left the wash to the intersection of the Church and Pioneer Streets of today. W. W. McCoy had moved from his lands in Crafton, and with A. A. Carter and the Reverend Josiah Bates, Pastor of the Congregational Church in San Bernardino, was occupying lands south of the Suverkrup holdings. Their land could be reached by the Berry Roberts Ditch but they claimed no interest in it, and whatever use they made of parts of it was with the consent of its owners. McCoy seems by this time to have obtained recognition of his claims to the waste water he had used ?n his Crafton property, and he now brought it down to his new holdings through the arroyo, the Indian Ditch mentioned earlier in these pages, the arroyo in which the Tenney Ditch had run from Orange Street on to the old mission lands west of Redlands. From this, McCoy conducted his water to his land.

He and his neighbdrs, Carter and Bates, used this water along with whatever Berry Roberts water came their way through the Tenney Ditch, supplementing it with water obtained through a connection of the Berry Roberts Ditch with the Cram & Van LeuvenNorth Fork Ditch that McCoy and some Indian helpers had made at a point now unknown. The Berry Roberts Ditch carried water to its full capacity in early winter and spring, and the McCoy group could doubtless draw upon it freely then. But it seldom carried anything after May or June, as the entire flow was then claimed by the Timber settlers. During the summer months domestic water had to be hauled. McCoy, Carter, and Bates entered claims to any waste water flowing in the Santa Ana bed after the Berry Roberts claims were satisfied, and these claims aroused anxiety and protest in the Timber Settlement.

In March, 1870, James B. Glover brought his family onto land not far from the claim of Mr. Craw, and lived there until March, 1873. He had no share in the Berry Roberts Ditch, but drew upon it for his domestic use whenever there was water in it, and was in a position to know what lands were irrigated from it. Roberts, Craw, and Suverkrup offered him an interest in it and its waste water, provided he would enlarge it sufficiently to carry the water for the four of them, but he did not accept the offer.

The Timber Ditch took all the water in the river at about the same time each year that Glover was on his land, and he testified that in the first days of June, 1870, he had to sink a well f or domestic water, as the Timber settlers had then turned all the water out of the Berry Roberts Ditch. He stated also that Suverkrup was then irrigating a row of cottonwood trees, and Craw was watering two or three acres of garden and thirty or forty fruit trees, while Roberts was irrigating about the same number of trees as Craw, but more garden. 20 [Ibid. Testimony J. B. Glover, p. 431.] These men were seriously affected by the withdrawal of water at this time. They watered considerable acreages during the winter and early spring, preparatory to plowing for grain, but water was then plentiful.

In December, 1870, Berry Roberts sold his land and his water rights to H. W. Ball, a burly, aggressive Texan who in 1867 and 1868 had acquired two farms in the Timber Settlement, along with a 30acre water right in the Timber Ditch.21 [Deed Book County Recorder, Book G, p. 469; Book H, p. 329; Water Commission Records, Book A, p. 81.] He now moved his family onto the new holdings. He may have succeeded Roberts as overseer, or watermaster, on the Berry Roberts Ditch immediately upon arriving there, but he does not appear in water commission records in this capacity until 1872. He would seem to have disposed of his land and his water rights in the Timber Settlement by this time.

During the year 1871 there was little change in the amount of land irrigated from this ditch. Dependent upon certain waste water as they were, owners of land along it made but few improvements. Craw put in some corn but this failed when, about the first of June, the ditch again went dry. Suverkrup kept his cottonwood trees alive by having water hauled to them. In 1872 Craw planted about ten acres of corn despite his ill luck of the year before, but in July the water failed, and he saved his crop only by applying to L. F. Cram for a run of water from the Cram & Van Leuven Ditch, bringing it through the connection McCoy had made. Craw became disheartened and sold his land claims and waste-water rights that year to Suverkrup.

Ball soon realized the inadequacy of his waste-water right, and in August, 1872, acquired forty-five shares, or acre rights, in the Timber Ditch. Suverkrup bought a thirty-acre right in the ditch that same year. Ball moved to take his newly acquired water over to his new lands, through the Berry Roberts Ditch, but was prevented for a time by the strong opposition of the Timber settlers, to the extent of physical combat in some cases. Ball, however, was in the habit of carrying his point by force when necessary, and he was not deterred for long. The move was revolutionary, since it involved the transferring of water rights from the north to the south side of the river. The water commission records of February, 1873, list Ball and Suverkrup as owners of the above-mentioned number of shares in the Timber Ditch, and Glover testified that this water was run through the Berry Roberts Ditch that. season. C. B. Bates, who held the title to land south of the Ball and Suverkrup property near land that had been acquired by his father, Reverend Josiah Bates, also appears in the 1873 list of water owners, but he had no rights in any ditch that would convey water to his land.

According to the practice observed by the Timber people, Ball and Suverkrup were permitted to use the entire ditch flow during the hours assigned to them by the Timber watermaster. They were not, however, permitted to run any part of it at other times, and this was most inconvenient.22 [Hewitt vs. Story. p. 433. Testimony J. B. Glover.] Since the Berry Roberts Ditch was small, there was not room in it for any waste water when they were using Timber water, and they had to eliminate all waste water on days when Timber water was due. It was clear that if all the Timber rights should ever be transferred, there would never be room in the ditch for waste water unless it was greatly enlarged.

Other men followed Ball and Suverkrup in buying Timber water rights, and by 1873 W. W. McCoy, J. B. Glover, Dr. Benjamin Barton, Colonel W. R. Tolles, C. B. Bates, and others, had Timber water which they wished to run through the Berry Roberts Ditch.23 [Deed Book County Recorder, Book P, p. 92; Book M, pp. 83, 163, 85, 86. Water Commission Minutes, Book B, pp. 85-86; Hewitt vs. Story, Testimony W. R. Tolles, p. 309.] In addition, Suverkrup made a deal with William G. Borron early in 1874, whereby later in the year he deeded to Borron his thirty-acre rights in the Timber Ditch and his two-thirds interest in the Berry Roberts Ditch, along with his waste-water rights in it. Borron was a Scotchman who had come to California from Australia.

Abandonment of waste-water rights had begun when Ball and Suverkrup placed their Timber Ditch water in the Berry Roberts Ditch. The abandonment became complete in 1875, when all the Timber Ditch rights were trans-

ferred to it.

When in 1874 the time came to irrigate, the new acquirers of Timber water started to take it through the Berry Roberts Ditch. To this Ball, as watermaster - objected; and acting in his characteristic manner he placed a dam in the ditch to exclude their water. Borron approved Ball's stand, but took no active part in the matter. Tolles and Bates at once went into conference with Ball as representatives of the thwarted water owners, and succeeded in reaching a verbal agreement with him that met their main needs. They were to pay him, as watermaster, the nominal sum of one dollar per acre-right of water for the privilege of using the Berry Roberts Ditch, and were to bear a proportionate part of the cost of maintaining it. They were also to aid in enlarging it, and would receive their Timber water pro rata along with the Berry Roberts people.

The ditch, which has been described in preceding pages, was a crude, makeshift means of bringing water to the south side of the river. Tolles testified that its capacity was not over one hundred inches. Its money value, as indicated when Roberts and Starke gave a one-third interest in it to Suverkrup and when Ball named so small a sum for its use, must have been insignificant. In each case the main interest displayed had been that of securing help for its upkeep and enlargement.24 [Ibid. Testimony Dr. Benj. Barton, pp. 565, 566.] The parties buying Timber rights and paying money to Ball and Borron under a verbal agreement evidently assumed that they were acquiring an interest in the ditch, but not waste-water rights. However, in litigation that arose over the matter a number of years later, Borron testified definitely that he had not sold any of his interest in the ditch or any of his waste-water rights, to them.

Whatever the understanding may have been at the time, no allowance for waste water in the ditch was ever made thereafter. During the irrigation season each owner of Timber water had the full flow of the Berry Roberts Ditch during the hours assigned to him. In other months of the year, owners of Timber rights were less particular, and a stream was permitted to flow to each Timber water owner for domestic use and for his stock and gardens, whether he had water rights or not.

It was a wasteful and uneconomical ditch. Colonel Tolles testified that in addition to being incapable of carrying more than a hundred inches of water when he first saw it, the long run in the river bed from the mouth of the canyon brought about the loss of as much as three hundred inches of water from seepage and evaporation. Therefore, if five hundred inches passed the Cram & Van Leuven-North Fork intake, only two hundred inches of river water could be expected to reach irrigators from the Berry Roberts Ditch. This was a serious factor in the situation, for the flow in the river in the irrigating season was often very small at best. W. C. Butler, a civil engineer, testified that he measured the flow at the head of the Cram & Van Leuven-North Fork Ditch one year, and found it to be seven hundred inches. Under such conditions as these, the half of the river flow belonging to Timber water owners might not yield more than fifty inches to anyone taking water through the Berry Roberts Ditch.

That so small a summer flow in the river was not unusual is shown in the Tolles testimony to the effect that in 1874, parties taking Timber water through the Berry Roberts Ditch had difficulty in getting enough even for domestic purposes. The writer knows from personal experience that in 1875, when practically all Timber Ditch rights had been transferred to the Berry Roberts Ditch, there was a period of three weeks when water from the river failed to reach even the first two farms on that waterway except for part of the night and forenoon of each 24-hour day. During these hours a small stream that might irrigate half a dozen rows of corn trickled through. The places beyond got no water at all.

The winter of 1874-75 had been one of scanty rainfall, and settlers realized that there would be a limited supply of water in the coming irrigation season. Early in the spring of 1875, Mr. Ball notified each person who had wa-

ter flowing through the Berry Roberts Ditch that assessment work would be expected of him in order to put the ditch in shape to conserve water and carry the greatest stream possible. The amount of labor by any one person was to be in proportion to the number of shares of Timber water he owned.

Mr. Ball had the workers clear away all boulders interfering with the smooth flow of water in the river channel and concentrated the stream in it for some distance, believing that in so doing water that had been lost before through spreading over a wide bed would be saved. But he made one serious miscalculation. Water flowing in the natural channel which formed the upper part of the Berry Roberts Ditch had carried mud during rains, and this mud had so coated the channel that the loss by seepage was much less than it was after the protecting layer was broken through. After the first day's work, the water in this part of the ditch sank much more than it had sunk previously, and the stream reaching the irrigators was noticeably smaller. As the weather grew warmer the decline in the river flow became such that by midsummer the situation was desperate, as already described.

In addition to his labors as a farmer and watermaster, Ball carried on a desert freighting business that called for one hundred and fifty horses and mules; and these animals were driven daily the one and one half miles between his property and the point on the ditch to which the water came. What these one hundred and fifty animals did to the ditch and what the housewives said regarding the pollution of their domestic water supply can easily be imagined. This period of -low water was ended finally by summer mountain rains that swelled the streamlets feeding the river.

Off to the southeast lived some settlers who owned Timber water but whose lands could not be irrigated from the Berry Roberts Ditch. The need of another waterway, a high line that would cover lands as far east as the present Mentone, became evident; and in the spring of 1874 W. W. McCoy and Hiram M. Barton, the latter a son of Dr. Benjamin Barton, a large holder, were engaged to begin work upon what was to be the Sunnyside Ditch. A grade was established starting from the river still nearer to the canyon mouth than the point where the Berry Roberts Ditch started, leading along the lower part of the red bluff that begins at Morton Canyon, and on across what we now call the Greenspot to the Mill Creek wash. The ditch was built thus far and then f unds were exhausted and the work had to stop. Nothing more was done toward a high line for several years or about 1878. 25 [Personal knowledge of author. Statements to him by J. H. Barton and George Miller, in 1934.]

The importance of Timber water f or irrigating a large acreage on the south side of the Santa Ana River was recognized by persons living as far away as San Francisco, and a party from that city headed by no less a personage than the San Francisco City and County Attorney came down about this time and offered to complete the Sunnyside Ditch for a half-interest in the Timber water rights. The offer was refused. Hard pressed though the owners of some of these rights were, they did not care to accept aid on such terms.26 [Personal knowledge of author.]

Early in 1877, a civil engineer, Fred T. Perris, and two associates bought twenty acres each of land that could be irrigated from the Berry Roberts Ditch and secured some Timber water. Perris suggested a way by which he thought the.ditch could be improved-by digging a waterway to start about where Mill Creek flowed into the Santa Ana in times of high water, running it along the base of the bluff on the south side of the wash and dropping into the Berry Roberts Ditch just before that ditch left the wash for the mesa. Owners of Timber water who could use the Berry Roberts Ditch, although still dreaming of the high line, realized that the ditch proposed by Perris would be better than the existing one; and as the prospect for money to complete the Sunnyside seemed hopeless then, they assented to the Perris plan, as a temporary expedient.

On May 17, 1877, therefore, on petition of a number of Timber water owners, the county water commissioners

authorized a new location for the upper stretch of the Berry Roberts Ditch, and directed that the ditch as a whole be known thereafter as "The South Fork of the Santa Ana, for irrigation purposes". This is the origin of the term "South Fork" as used by Redlands water users today. The Berry Roberts Ditch ceased to exist, officially, and became the South Fork Ditch, but the old name persisted locally for some time.

The new ditch was dug and had some advantages, one being the fact that it confined the water in a narrow channel at the base of the bluff. It was inexpensive to build, for it involved little more labor than that of rolling the boulders out of the way and opening the rude ditch. It was comparable in this respect to the North Fork-Cram & Van Leuven Ditch which came down on the opposite side of the Valley. Its disadvantages were mainly that it was still very porous, permitting a large loss of water through seepage, and that owners of more than a third of the South Fork rights, as we shall now call them, were unable to get their water through it to their lands. Among these latter were C. E. Brink, C. P. Barrows, and Dr. J. D. B. Stillman. A portion of Dr Ben Barton's land also was above it.

The ditch served the region through that season, but in the spring of 1878 funds became available for the completion of the high line. Dr. Stillman, holder of the largest right to South Fork water and owner of the lands now occupied by the University of Redlands, had been conducting experiments for Senator Leland Stanford, a great horse fancier, on the movements made by a horse in trotting. An assistant had devised an apparatus with which Dr. Stillman made a series of photographs showing the position of a horse's legs each instant as it moved, the first successful moving pictures, so far as is known. He received a substantial sum from Senator Stanford for this achievement and the book he published on the subject, and was then able to help decisively in the resuming of work on the Sunnyside Ditch.

C. C. Miller, father of the Frank Miller of Mission Inn fame and an engineer of wide experience who had for years been employed by various Riverside water companies, was engaged by Dr. Stillman to represent his personal interests, and was also engaged by the shareholders in general. He laid out a line scientifically, following approximately the line taken by the ditch that had been begun in 1874, and carried it through the rocky lands in the area which is now Mentone and on to the present Lugonia Avenue. From there the line ran west to the old Tenney Ditch of 1856, connecting with it a short distance east of what is now Orange Street.

The grade along Lugonia Avenue was very steep, and in order to prevent undue erosion a stretch of two miles was paved with heavy boulders. There was a serious question as to whether loose rocks laid in such sandy soil with no cement would stay in place when a large stream was flowing in the ditch, but the lack of f unds for a better type of construction led the settlers to take the chance.

To fill the spaces between the stones, heavy red soil from the hills to the south was hauled and spread on the ditch bottom, and a very small stream of water was run over it till the soil was settled, an operation known as "puddling". The stream was gradually increased and all worked out satisfactorily, to the intense relief of all concerned. No rocks in the ditch were swept out of place, and in a few weeks a full head of water was running in it. This open water-way was used for many years, but was finally replaced by a pipeline to avoid loss of water through seepage and evaporation.

The work of excavating and paving the Sunnyside was done with common labor hired on the streets of San Bernardino. The Times of February 16, 1876, carried the advertisement: "Fifty laborers wanted to construct a water ditch.... Appy to C. E. Brink, near Crafton, or to E. G. Judson, near Colonel Tolles', or to Dr. Campbell, at Drug Stote in San Bernardino. . . ." The only skilled laborers employed were the carpenters who built the bulkhead at the intake and the flume across Mill Creek. The construction boss was Frank A. Miller, son of the engineer in charge and years later master of the Mission Inn in Riverside. He was at that time under twenty years of age,

and it was impressive to see so young a man in so responsible a position. E. G. Judson, a trained accountant from a New York broker's office, was head of the auditing committee, and the writer worked under him, gaining valuable training.

The new ditch was recorded by the water commissioners in 1878 as "The Sunnyside Division of the South Fork Ditch", an awkward and inaccurate designation, since all South Fork water, with the exception of that owned by Mr. Ball, was at once transferred to the new waterway and the South Fork, or old Berry Roberts Ditch, actually came under the management of the watermaster of the Sunnyside, as an auxiliary line. In ordinary seasons, so long as there was surplus water in the river, the South Fork Ditch was used to convey water for domestic, garden, and stock purposes to owners of South Fork rights whose lands could be reached by it, without regard to schedules. In one flood year, however, when the surplus flow was unusually great, both ditches were used on schedule, and double time was allotted on all water tickets.

All owners of South Fork water excepting Mr. Ball had contributed their share of the cost of completing the Sunnyside. Ball had been unsympathetic toward it, declaring that it would benefit none but the owners of land above the old Berry Roberts Ditch. Actually, all benefitted, since water loss was greatly diminished in it. The wholesale transfer of water rights to it became disadvantageous to Ball, for since his short-time water consequently ran by itself, much of it was lost. Realizing this, he determined to send his water through the Sunnyside Ditch even though he had paid no assessments. In this he was showing some of the direct action of which he was so fond.

N. B. Hicks, watermaster of the Sunnyside, instructed Charley Barrows, the zanjero, to turn the Ball water out of that ditch when it appeared. Barrows did so one hot day in midsummer and went home. He soon saw the water flowing in the ditch again, went second time to the head of the ditch and turned the Ball water back again to the old Berry Roberts Ditch. This time he hid the gate that controlled the flow, and started for the Hicks home to report. On the way he encountered Ball, who gave chase with a riata of braided rawhide. Fortunately for Barrows, his horse was the faster and he escaped the thrashing that was clearly in prospect for him.

On hearing of all this Mrs. Hicks, who was something of an Amazon, set out in her carriage with a loaded gun to search for Ball. He, however, had given up for the day and had gone home after making a. breach in the Sunnyside Ditch that left it unusable until repaired. A few days later he swore out a complaint against Barrows for interfering with his irrigation water. Arrest of Barrows followed, and he was slated for trial in a justice court. Ball, however, had been injured in the meantime in a fall from a horse, did not appear in court when the case was called, and it was dismissed. He had been the first to transfer his water rights in the Timber Ditch on the north side of the river to the south side, against the violent protests of his neighbors there; but now he was vigorous in his objections when owners of the Sunnyside took their water away from the ditch he was managing. He endured the changed situation for about two years, but in 1880-81 sold his land and his water to E. G. Judson and Frank E. Brown, two energetic and farsighted young men who had come to Lugonia, the community that was then the main user of South Fork water. Ball left for the vicinity of Visalia in the San Joaquin Valley where there was a colony of other Texans.

Before this deal with Ball, the eyes and thoughts of Judson and Brown had been attracted to the undeveloped lands north of the Santa Ana River in what is now East Highlands, and they had started some enterprises there. In 1879 they had built a fruit dryer near the Cram ranch, and were handling peaches, apricots, and some apples. They saw that opportunities for profit would be sure to follow the moving of the Cram & Van Leuven-North Fork Ditch from the base of the mesa, or "bench", to a line high up on it, and developing the region it would

then cover. They accordingly bought possessory claims of settlers living on Railroad Section 35, now the center of the East Highlands Orange Company holdings, secured options on other lands in the vicinity, and after a series of open meetings with the owners of Cram & Van Leuven and North Fork water rights, contracted to build the high line for $1000., a merely nominal sum. Brown had been a student of engineering, and figured that this amount would be enough.

During the year 1881, using Cutter's formula in his computations, Mr. Brown had made an extensive study of the water situation at the east end of the Valley. In March he measured the capacity of the North Fork-Cram & Van Leuven Ditch where it left the canyon, taking his measurements at the minimum point not far below the ditch head. He found the capacity of the ditch there to be 2462.4 miner's inches. In September of that year, he measured the capacity of the Sunnyside Ditch and found it to be 1864.8 inches. Two years later, in March, 1883, he measured a stream flowing in the Berry Roberts Ditch and found it to be 288.7 inches. This, however, did not represent the ditch's full capacity. He reported all these measurements on the witness stand in the Hewitt vs. Story water suit in 1888, testimony in which is referred to frequently in following pages. The Sunnyside and Berry Roberts ditches constituted the South Fork System when Mr. Brown made his measurements, and they had a capacity then of more than 2000 inches.

The Lugonia Water Company, organized in 1883, ran their water through the Sunnyside Ditch. By using the water out of irrigating season, they saved themselves the expense of pumping from the subterranean water basin.

in their upper reaches, above the points where distribution of irrigation water began, these ditches were capable of carrying the large streams of water of the winter and spring, when the river flow was at its maximum, streams well over 2000 inches. This water was utilized in flooding lands for grain and alfalfa, as noted in preceding pages.

Recorded contemporary documents indicate that even then owners of water rights in the river at the mouth of the canyon were dreaming of paved and cemented ditches throughout their length with a capacity of 2000 inches, although such ditches could not become realities for some time to come. When, some time in 1881, Judson and Brown began tunneling under the river bed below the canyon mouth to secure water for their Redlands colony, owners of North Fork and Cram & Van Leuven water rights became alarmed lest some of their water would seep down into the tunnel and be drained off. To quiet their fears, Judson and Brown offered, in an agreement dated December 28, 1881, to build a redwood flume one hundred rods (1650 feet) in length with a capacity of at least 2000 inches to convey North Fork and Cram & Van Leuven water from the head of their ditch past the area the tunnel might drain, and to do no further digging north of a line six hundred feet below the head of said flume.

Confirmation of the dreams of paved canals that were being indulged in by owners of water at the mouth of the canyon-South Fork as well as North Fork and Cram & Van Leuven people-may be seen in an agreement the South Fork owners entered into with the Bear Valley Land and Water Company on February 27, 1886, an agreement which provided that if for any reason the Bear Valley Company should forfeit rights acquired under the agreement, South Fork water owners might purchase any new, improved, or enlarged ditch the Bear Valley Company might have constructed, at a price to be determined by disinterested appraisers. It was stipulated that if any such ditch had a capacity of more than 2000 miner's inches, appraisers should disregard the cost of the excess capacity.

The new high-line ditch Brown proposed for the north side of the Valley would be a fine thing. North Fork water owners had been irrigating low-priced land on the flat merely to grow corn and other common farm products.

With the new line in operation, those who cared to do so could sell their water, at greatly advanced prices, to people who could use it on the mesa in growing oranges, a much more lucrative crop. The Crams and Van Leuvens had dry bench land that could be watered from the high line canal.

The enthusiasm that had seized Judson and Brown infected the writer and his mother, and although owning land on Pioneer Avenue in Redlands, they joined with the young men in negotiating with T. Schuyler Ingham for a certain tract on the north side of the Santa Ana that could be watered by the new ditch. The deed to the tract was obtained in March, 1881, and Judson, Brown, and the Beatties divided the land equally among themselves. The Beatties were fortunate in being given the land through which the ditch would run.

The flume-that was to bring the ditch water across a deep ravine known as 'Bledsoe's Gulch had been completed in the latter part of 1881 all but the supporting guy lines, the Beatties paying $333., or one-third of the estimated cost as had been agreed upon. It had been built on the direct line of the ditch, crossing the gulch on a trestle one hundred and twenty-five feet high. The ditch itself was not then completed, and the job as a whole had not been offered for the acceptance of the persons who had let the contract. In November, a strong north wind blew the still unsupported trestle over into the gulch, and there it lay shattered. This was a disaster for all concerned. People who had acquired land along the high line were panic-stricken lest there be no water to irrigate the crop they were expecting to plant. Judson and Brown, however, salvaged what they could from the broken trestle, replaced the rest with new material, and built a new one farther up the gulch at a point that did not call for so high a crossing. They extended the ditch on the east side of the gulch to connect with the new trestle, and on the west side carried the water back in a flume laid on a shelf cut in the gulch wall to the line of the ditclA proper.

The ditch had not started at the canyon mouth, but at a point on the Cram & Van Leuven-North Fork Ditch a little above Oak Canyon and the Aplin ranch. The Cram & Van Leuven owners thereafter ran their water in the new Judson-Brown Ditch to a point called the Cram & Van Leuven Divide, about four miles below the canyon mouth, and from there built a ditch to connect with their old one below the bench.

When negotiations for the Ingham property began, Judson and Brown had it in mind to do on a small scale in the East Highlands area what they later did in establishing the Redlands colony. They doubtless intended to make their homes in the Highlands. But when, shortly before the Ingham deal was consummated, the opportunity had come to purchase Ball's one hundred and sixty acres of land with a thirty-three-acre South Fork water right for the absurdly low price of $6,000, the offer could not be passed and they accepted it. The deed wag signed January 17, 1881.

The extensive water rights which they acquired with this Ball property inspired them with the idea of founding and devoloping a colony on the red soil lands between what is today Colton Avenue in Redlands and the hills to the south. They fulfilled their contract on the East Highlands high line though it cost them four times what Brown had estimated, sold their holdings on the north side of the river, and ceased to have any special interest in the East Highlands region. The Glass family bought from them the part that constitutes the present (1951) George Hamilton property, and the Beattie and Barrett families bought the remainder. Judson and Brown proceeded then to acquire South Fork rights to Santa Ana River water from other individuals in the Lugonia area until they had a total of fifty. These rights, together with a small surface flow from Morton Canyon and some additional water from a tunnel under the stream-bed exit of the river from the mountains, constituted the water supply for the first five hundred acres they offered to the Redlands colony-to-be. This was, of course, before the water storage reservoir in Bear Valley was contemplated. No further discussion of South Fork water rights will be attempted by the writer, as they now passed out from under his knowledge and experience.

The high line ditch in East Highlands presented problems almost from the first, owing to its instability. It was of small capacity, a mere shallow excavation in the soil, with flumes, where required, of one-inch redwood. Two boards formed the V-shaped bottom, and similar boards nailed to them formed the sides. The ditch followed the contours along ridges, through gullies, over gopher and squirrel holes,

and often gave way at weak points, remaining dry sometimes for several days while repairs were being made. When breaks occurred, all men along the line turned out to mend them, as they interferred not only with irrigation but also with the supply of water for domestic use and for stock. At such times fresh water for house use was hauled from a stream that flowed from a spring at the base of what is now designated as Mount Harrison, above what was then the Cook ranch. 11 During the year, 1880 R. F. Cunningham, representing a number of Riverside parties, bought a quantity of land lying mainly on City Creek south of Harlem and Rabel Springs. He also bought a supply of North Fork water. One of his clients, John Stone by name, bought forty-three hours of water through him, thereby becoming the main owner in the North Fork Ditch. Cunningham and various persons influenced by him made extensive planting of deciduous fruits, and within a year or two the lands south of Base Line from the springs to City Creek were under cultivation, mostly in small holdings. When Judson and Brown built the high line ditch this settlement became the ditch terminus. It went through the Beattie and Barrett places on the mesa, down into the City Creek wash by a flume on what is now the Draper property, reached the present Boulder Avenue in Highland below Atlantic Avenue, and followed the line of Boulder to Base Line, continuing west along that street in what today is called a gutter. The lands south of Atlantic and the portion of the Highland settlement near Base Line could be irrigated with the North Fork water, but for the land north of Atlantic there was no water except the limited amount flowing in City Creek.

Although the ditch owners realized from the very outset that to prevent loss of water by seepage and end the ever-present menace of breaks in the line the entire ditch should be paved and cemented, such work would entail a heavy financial outlay which most of the owners could ill afford. So thoroughly was the need understood, however, that Mr. Cunningham took it upon himself to contract with Mr. Aplin, who had taken up Government land east of Plunge Creek, to pave and cement the ditch from Santa Ana Canyon to about half a mile east of Plunge Creek. This work was done without consulting the water owners, and had to be discarded later as the ditch thus treated was too small. The owners, however, paid the cost without murmuring, as they benefited by the improvement for the time being.

About this time H. M. Beers, of Riverside, bought the Whitby ranch in the Highland district, a ranch which included Harlem Springs and moist lands adjacent to it, and much dry and unirrigated land to the north. With this ranch went thirty hours of North Fork water. Seth Marshall, representing the Cheney Brothers, who were silk manufacturers in Connecticut, also bought land west of the tract now owned by the State Hospital at Patton, and a thirty-six,hour right in the North Fork Ditch. People were beginning to make homes around the center that forms the town of Highland today, and a strong sentiment developed in favor of changing the terminus of the North Fork Ditch to a location that would make possible the irrigation by North Fork water of lands all the way to the base of the mountains.

Such men as Stone, Beers, and the Cheneys had the means with

which to pay their part of the expense of such an undertaking, and as a result the paving project that had seemed out of the question for so long now became possible. Several important questions naturally arose, such as the form of organization under which the work would be done, how near to the base of the mountains the community would be justified in building the main ditch, and how much should be left to individual investors to do at their own expense.

Seth Marshall believed that saturating ground with water in winter and spring months when the river was nor-

mally high would enable the smaller flow of summer months to meet the needs of much more land than could be watered otherwise, and he insisted as a condition of his co-operation that the ditch be materially enlarged throughout its entire length so that it could carry a large amount of water in the spring months.

These various questions and demands called for many meetings of water owners, some in private homes and some in the old Cram schoolhouse west of the Cram home. On one occasion James A. Gibson -later to become in turn Superior Court Judge, Supreme Court Commissioner, and member of a leading Los Angeles law firm, but then just beginning the practice of law in San Bernardino County and desirous of making acquaintances- responded to an invitation to attend a meeting at which forms of organization were to be discussed. He gave a talk and later prepared a paper, without charge, explaining the difference between partnerships and corporations. A partnership was clearly unsuited to the needs of the North Fork people. The owners of the greater part of the North Fork rights wished to incorporate, but there was a deep prejudice against corporations on the part of a number of small shareholders, and it did not seem practicable to form any sort of permanent organization just then.

By the fall of 1883, however, all agreed that the Judson-Brown Ditch should be enlarged to a capacity of 1500 miner's inches, should be carried north through the San Andreas Fault Ridge by a tunnel on the Cook property, make the shortest possible detour in crossing City Creek, and return to Highland Avenue to run along that highway to a terminus at Palm Avenue, leaving the construction of a higher line at the base of the mountains to such owners of land above Highland Avenue as would be benefitted by it. It was agreed that after this extension of the old ditch and the completion of the new terminus, the improvement of the worst stretches of the old part should be undertaken.

It was also decided that the work agreed upon should be directed by a committee of three of the smaller shareholders in the ditch, in order to assure other holders of small rights that they were not to be exploited by the owners of large interests. Joseph L. Jackson, George Miller, and George W. Beattie were chosen to form this committee. The three men controlled but seventeen of the two hundred and forty hours, or shares, of North Fork water. Money for the undertaking was to be secured through voluntary assessments on all owners of rights in the ditch, the assessments to be levied and collected by the committee as needed. There were no legal means of compulsion

for delinquents. The realization of the necessities of the situation were all that supported these assessments.

Joseph Jackson was a man of means and business experience, and as long as he was on the committee he framed its business policies. He was, however, an invalid, and, his health taking a turn for the worse, he sold his home in Highland and left the community a few weeks after the work on the ditch began. He was succeeded by B. B. Fesse nden, a man of character and ability. Mr. Jackson had suggested the employment of W. H. Randall, father of the M. M. Randall who was so prominent in Highland in later years, as foreman of the ditch construction work at five dollars a day. Mr. Randall had just completed a new paved ditch from City Creek to certain lands in the Highland community. He had had long experience in rock work in the Virginia City mines in Nevada, and there was much rock work to be done on the line to the proposed new terminus. He was reluctant to leave his own interests, but finally consented to oversee the building of the line f rom the Cook place to Palm Avenue. Some of the ditch owners thought the committee was paying him too much, but most of them approved of the arrangement. No member of the committee was then receiving any remuneration for his services or his traveling expenses.

Mr. Jackson did the bookkeeping as long as he was a member of the committee, but when he left Mr. Beattie took over that part of the work, collecting the assessments and paying the bills. The collecting called for fre-

quent trips to Riverside, as some of the more important shareholders lived there. George Miller rendered valuable service in arranging for teams to haul rocks and other material and supplies. A gang of Chinamen that Mr. Randall had used on the ditch from City Creek was augmented in numbers, and did the digging, paving, and cementing. T. T. (Uncle Tommy) Cook, who had recently married the widow Weaver and was managing her property, took the contract for the tunnel through the fault ridge on her land. This tunnel was later replaced by an open cut.

In January, 1884, Mr. Randall's work on the lower end of the ditch was completed and bills for it were paid. He had done all that he had agreed to do, and was willing to oversee construction on the upper stretches of the line. It was then proposed that Mr. Beattie assume the foremanship for the work still to be done, with comPensation of three dollars a day f or the time he spent on the job. Mr. Fessenden took over the collecting of assessments and the paying of bills, as the foreman could not be expected to attend to them also.

The part of the ditch beginning at Oak Canyon was easily accessible, so paving began there and proceeded west toward Plunge Creek. As the work progressed, more and more had to be done in preparation. George Miller worked on the line a part of the time making roads to the stretches of ditch between Oak Canyon and Plunge Creek that were hard to reach, and delivering boulders along the line for use in paving. For such labor he was placed on the pay roll at regular rates. The working force proper consisted of fifty Chinamen and twentyfive white men, among the latter some ex-Holcomb Valley miners and some Mexicans who had been employed by Mr. Beattie the spring be-

fore in grading the Barrett property. All these laborers were housed in tents along Plunge Creek.

Until the latter part of January, 1884, the season had been one of prolonged drouth, but heavy rains then began to fall. There have been flood conditions where there has been more water in the streams, but never a time within the memory of the writer when the rains extended over so long a period. They continued well into July. Seventeen days in February were so stormy that the Chinamen stayed in their tents unable to work. The white men left to seek quarters in San Bernardino, and few of them ever returned to the job. The ditch was damaged at many points by washouts, and in some places entire sections were obliterated.

About this time serious dissatisfaction developed among some of the ditch owners. In following the instructions to enlarge the ditch to a capacity of 1500 inches, the paving from Oak Creek had begun with a ditch shaped like _/, the bottom four feet across. The Cram & Van Leuven people, who were paying one-third of the cost of this section, were in the habit of irrigating with the summer flow of the river and were not interested in Seth Marshall's idea of using surplus water in the spring for spreading purposes. What they wanted was a ditch that would conserve the summer flow to the utmost, and such a ditch as Mr. Aplin had built under contact with Mr. Cunningham was more to their'liking. No ofie at that time dreamed that the summer flow would one day be supplemented with'water from a mountain reservoir so that the flow in the ditch would be large and stable during the whole irrigating season.

A conference of the North Fork committee with L. F. Cram, representative of the Cram & Van Leuven owners, was held near Oak Canyon. Mr. Cram was determined to reduce the size of the ditch that Beattie, the foreman, was building, declaring that in the existing form the summer flow would spread over so wide a bottom that much would evaporate. George Miller agreed with Mr. Cram, and the com~ mittee faced a crisis. Unless the ditch was made smaller the Cram & Van Leuven people would refuse to contribute to the cost; but on the other hand, if the capacity of the ditch as already begun was not maintained, Seth Marshall and his followers would withdraw their support. The arguments of Beattie and Fessenden were unavailing, and it 1poked as though work would come to a standstill, with the ditch out of commission as a result of the heavy rains that had fallen. A pos-

sible compromise occurred to Mr. Beattie. He proposed that the

form of the ditch be changed to ~,J. Such a change would mean a canal with a narrow bottom that would handle a small summer stream economically, while by means of the nearly vertical upper walls built on the lower framework, the capacity of the ditch as begun would be retained. The plan was approved by both sides in the dispute, and the remainder of the paving done that season followed the new pattern.

The rains continued, often destroying work that had cost toil and money, and only too often damaged property of ditch owners themselves. Some of them became depressed and failed to meet their

assessments. For some time money could not be collected to meet the pay rolls in full, and even partial payments to the workers were possible only through prompt responses to the assessments by the large shareholders. Finally, Marshall and Beers refused to advance any more money until North Fork owners incorporated as a mutual water company.

The Chinamen continued,their work on the ditch until early in the summer of 1884, paving it from Oak Canyon to Plunge Creek and through Elder Gulch, where the East Highlands Orange Company today has its camp. These sections had been particularly unstable and could not safely be left unpaved. The Chinamen also opened the entire line so that water could run through it in the coming irrigation season. It did not, however, become necessary to irrigate from the ditch until August, since there were soaking rains as late as July.

When the work ceased there was no money to meet the delinquent pay roll, which by that time amounted to about $1500. A move to incorporate was under way, but time was necessary for its completion, and it was difficult to make a gang of Chinamen understand that they would be paid as soon as the North Fork could be incorporated. The entire band moved down to the home of foreman Beattie, and for three days sat on the ditch bank in his yard. There was not the slightest suggestion of ugliness in their attitude or behavior, but whenever he stepped out of the house”a group surrounded him, and each would take his turn in telling pitiful tales of the distress of the wives and children back in China.

On the afternoon of the third day, a well-dressed, fine-looking Chinaman appeared. Mr. Beattie explained the situation to him and assured him that he (Beattie) would be personally responsible for the payment, which would be made as soon as the incorporation was accomplished. The Chinaman was satisfied, uttered one sentence to the men and they immediately began to move off. Not one of them rebelled again. In February, 1885, the North Fork incorporation was completed, and the first act of the new company was to provide money to pay this long-standing debt. The head Chinamen in San Bernardino, who had supplied the laborers, were firm friends of Mr. Beattie as long as they remained there.

The ditch was completed in time for the August irrigation, but there was urgent need for the arching over of the portion above the mouth of Oak Canyon, since about a mile of it was liable to be f illed with sand and gravel whenever flood water came down from the hills behind. In. the early part of 1885, therefore, after the incorporation of the North Fork, bids on this piece of work were called for, and Taylor Brothers, who were beginning their long career as general contractors in the Redlands district, were awarded the job.

In bringing about the incorporation of the North Fork Ditch, the greatest difficulty was, as has been said, the fear on the part of many of the small shareholders that they would be imposed upon by any organization that might be formed, and the time spent in overcoming their objections caused great delay. Usually, in forming a mutual

water company, rights held by individuals are conveyed absolutely to the company by a simple deed; but in the case of the North Fork, in

order to quiet fears it was agreed that the water rights should be granted to the corporation by a trust deed limiting the possession of them to a term of twelve years. This gave an opportunity to try the arrangement out. The trust deed also contained the provisions requiring a four-fifths affirmative vote of the subscribed capital stock in a legally called stockholders' meeting to authorize the alienating of any interest in the ditch or water rights of the, company, and a three-fourth vote of the subscribed stock in such meeting to permit the mortgaging of the company's property. Another provision was that the deed should be signed by owners of three-fourths of the 240 hours, or shares, in the ditch before becoming effective. Such restrictions on the powers of the company were necessary if approval of owners of the required amount of stock was to be secured.

There were many public meetings and private conversations, and discussions sometimes became heated. In time, however, more than the necessary three-fourths of the stock required was secured and incorporation was accomplished. When these shares were signed up, most of the owners who were delinquent in the assessments that had been levied previously by the construction committee, signed the trust deed and paid the money they owed. Some of the other shareholders delayed several years before signing, but when they did sign they also paid their delinquen t assessments. William Penn Rogers, last of the shareholders to sign, did so six years after the incorporation; and as he had been clamoring for compensation for damage to his property because the ditch passed along the Highland Avenue side of it, but within the road limits, the company waived his $100 delinquent assessment and he came in scot free. His was the only instance of this sort. Under the voluntary plan of contributing for construction and maintenance of the ditch, assessments totalling $10,000 had been levied and collected, with the above exception.

On completion of incorporation the stockholders met, appointed L. C. Waite president; R. F. Cunningham, vice-president; G. W. Beattie, secretary; the Bank of San Bernardino as treasurer; and W. H. Glass as superintendent.

None of the fears and misgivings of certain water-right owners have ever been realized. When the twelve trial years were ended, all owners of stock in the ditch conveyed their rights to the North Fork Water Company for the life of that corporation, and in the threescore years it has been in operation there has been no occasion for invoking the four-fifth or the three-fourth stock vote for which provision was made.

The enlarging of the stretches of the North Fork Ditch that were still less than f ull size extended over a period of 1, ears, as it could be done only when water was not required for irrigation. It was carried on under the supervision of Superintendent Glass, who obtained his laborers from the streets of San Bernardino.

The Redlands colony grew, and more land was acquired. As a result, the original water supply provided for it by Brown and Judson became inadequate; and by 1883 Brown was giving serious consideration to a reservoir site in Bear Valley that had been examined by

the California State Engineer three years before. In October, 1883, the Bear Valley Land and Water Company was incorporated, to acquire land there and construct a dam to impound water then flowing from the valley into Bear Creek, the main mountain tributary of the Santa Ana River. Work was begun immediately, and the dam was completed as far as planned by November of the following year.

Closing of the outlet gate in the dam constituted an encroachment upon rights already established in the flow of the Santa Ana, so no storage of water could begin until satisfactory arrangements were made with the owners of rights in the valley below. It will be remembered that the river flow was divided equally between the North

Fork-Cram & Van Luven Ditch and the South Fork Ditch. After much discussion the Bear Valley Company, on May 5, 1885, entered into an agreement with the NorthFork-Cram & Van Leuven water owners, the Cram & Van Leuven people having a one-third interest in the upper part of the North Fork Ditch. An agreement was entered into with the South Fork water right owners February 28, 1886, as noted earlier in these pages. These agreements were, in part, contracts covering work to be done and, in part, deeds conveying water rights and interests in ditches. Thy also contained stipulations as to relations that were to exist between the parties involved. The main features were as follows:

Each group of water right owners transferred to the Bear Valley Company all rights to water in the Santa Ana River in excess of the amounts specified in the agreement to which it was a party. The Bear Valley Company bound itself to deliver to each group, at the time specified, the amount of water to which its agreement entitled it, but was under no obligation to deliver more than six hundred miner's inches to any group during the irrigation season. In case it failed to comply with its commitments, it forfeited the rights acquired under the agreement; provided, that in case of a temporary failure due to causes beyond its control, all water of the river, stored or unstored, was to be allowed to flow down to the point fixed f or the division of the stream between the North Fork-Cram & Van Leuven and the South Fork Ditches. Also, in case of failure, any rights, privileges, and interests the Company had gained under the agreement were to be returned to the former owners or their successors, under the conditions existing at the time the agreement was f ormed.

Owners of rights in the North Fork-Cram & Van Leuven Ditch conveyed a one-half interest in their main ditch to the Bear Valley Company for $4,000, agreeing to enlarge it to a 1500-miner's-inch capacity and pay one-half the cost of such enlargement, the Bear Valley Company to pay the other half. Further enlargements could be made by mutual agreement, the parties sharing the costs equally. If an agreement was lacking, either party could proceed, at its own expense. The cost of maintaining the ditch was to be shared equally. In matters of policy requiring action or decision under the agreement, the initiative was to be retained by the North Fork-Cram & Van Leuven interests. The Bear Valley Company agreed to maintain a flow in the ditch from June 1 to November 30 of each year-the main irrigating months-according to a specified schedule. In the other six months of the year, the North Fork-Cram & Van Leuven half of the river flow was to be shared equally between the owners and the Bear Valley Company.

The owners of South Fork water rights conveyed not only their rights to any water beyond amounts scheduled, but their main ditches also. The Bear Valley Company assumed responsibility for any needed extensions or enlargements, bearing the entire cost thereof along with the cost of maintenance.

In the agreement with the North Fork-Cram & Van Leuven people, the Bear Valley Company guaranteed deliveries of miner's inches of water as follows: June, 500 inches; July, 600 inches; August, 600 inches; September, 550 inches; October, 450 inches; November, 400 inches. From December to May, the Company guaranteed delivery of one-fourth the water in the river apart from what was being impounded in the Bear Valley reservoir. Any surplus thus apportioned but not "required or desired" by the owners of the North ForkCram & Van Leuven rights might be used by the Bear Valley Company, but the owners were to be the "sole judges of whether such surplus is or is not required by them."

In the agreement with the South Fork owners, the Bear Valley Company guaranteed delivery to them of 466 2/3 miner's inches of water from May to October inclusive of each year; but water not used during the earlier of these months could be added to the guaranteed 466 2/3 inches for any subsequent month until 600 inches was reached. Six hundred was the maximum. In other months of the year, 300 inches were to be delivered. There were provisions for increasing the flow in these other months in years of abundant rainfall, and for diminishing it in years of drouth.

As described early in this paper, the amount of water allotted to owners in the old Timber, later the South Fork, Ditch was at first a varying quantity determined from year to year largely by the number of acres to be devoted to summer crops. In some seasons there had been no more than 242 acre rights, and it was a good many years before 369 was fixed upon as the number of acres entitled to water from that canal. The frequency with which growers could use their water varied also. When in 1874, the writer began irrigating in Lugonia with South Fork water, it came to him every seven days. How long this had been the "period of rotation" he cannot say. In the course of five or six years, the period was extended to 7 1/4 days, thereby making an irrigation start part of the time in daylight and part of the time in the night. This was only fair.

Certain large holdings in the Lugonia region were sold off in small parcels about this time, and the rights of these smaller holders to the entire flow in the ditch were for such short periods that irrigating became exceedingly co , mplex. Near neighbors often pooled their water and divided it proportionately into smaller streams, so that each could irrigate for a longer time and not have to handle the entire flow. In a few instances where pooling was not feasible, growers constructed reservoirs to retain part of their flow, and were thereby able to use a smaller stream for a longer time than would have been possible otherwise.

In the case of the Cram & Van Leuven Ditch, on the north side of the Valley, the term of rotation was every 144 hours, conforming to the number of shares in it. This meant a six-day period. There were fewer shareholders in this ditch, and a number of them had the right to use the full stream for at least twenty-four successive hours. L. F. Cram, however, when selling a portion of his water stipulated that it should be taken at night only, thereby reserving his own runs for daylight when adjustment of the flow in his fields was easier.

The North Fork Ditch had a 240-hour, or ten-day period, but when the writer moved to East Highlands and began using North Fork water, he seized the first opportunity that came to put forward the plan that had been adopted by the South Fork people, that of lengthening the period of rotation by a fraction of a day. George Miller, then the North Fork watermaster, asked him to prepare the schedule for the water tickets to be issued that season, and this gave the chance to suggest that the water come every ten and a fraction days instead of every ten. The growers agreed to the change, and as it proved satisfactory it was continued for several years, until the enlarged ditch and the greater number of water users made another plan necessary.

When the North Fork was incorporated and the writer became the secretary, he proposed an entirely new system in which each run of water should be twenty-four hours or a multiple thereof in length. By this arrangement a grower could take any portion of his monthly quota desired, all for one day only, one-half for two days, one-third for three days, and so on. Sandy loam could be irrigated with a large stream for a short period if desired, and heavy soil which required a longer time for water to penetrate could have a longer time. Also fractions of a run could be taken at intervals during the month, making it possible for berries and garden crops needing water at frequent intervals to be cared for as effectively as orchards, which latter might neeil water no oftener than once a month.

The new proposal met with general approval, and Superintendent Glass prepared the water schedule in accordance with it. The plan has stood the test of nearly sixty years and seems entirely satisfactory, although at times the ingenuity of schedule makers has been taxed to avoid heavy drawings of water from one part of the ditch at the expense of other parts. The operation of the system has been greatly facilitated by the fact that the State Hospital at Patton, one of the North Fork's heaviest water users, receives its flow in a reservoir holding an amount sufficient to serve the hospital for a considerable period of time. Water enters it from the ditch every day, but in

no set quantity, and this gives the schedule maker a leeway that enables him to equalize the flow all along the line and meet varied demands. For a good many years the North Fork schedule has been made by the zanjero and not by the Superintendent; and in chosing a zanjero care has to be taken to select a man possessing the arithmetical knowledge necessary to compute the water quotas correctly.

The owners of the Cram & Van Leuven Ditch retained their old system of distributing water for many years after the North Fork adopted the new plan. Their water was taken from the point on the

North Fork Ditch f our miles below the mouth of Santa Ana Canyon known as the Cram & Van Leuven Divide, as has been said earlier, and one-third of the flow in the North Fork Ditch went automatically into their canal. Most of their water continued to be used on the original pioneer holdings below the bench; but as the heads of these families died their heirs placed more and more water on bench land, and many of the early holdings were subdivided to a point where owners of Cram & Van Leuven water found it advantageous to adopt the North Fork system of distribution. The original North Fork articles of incorporation provided for the inclusion of the Cram & Van Leuven Ditch and water rights should the latter group ever care to enter the North Fork Company.

The Cram & Van Leuven interests incorporated as a separate company in February, 1890, and continued thus to operate for the next thirty-five years. There were, however, disadvantages in this separation. They had certain rights in the North Fork Ditch as far down as the Divide, but they were not eligible to serve on the North Fork board of directors, and they had no vote in North Fork meetings. They had not cared to assume any responsiblity for the lower part of the ditch, since their water did not run in it. However, certain owners of Cram & Van Leuven water had acquired lands that could be irrigated from the lower North Fork Ditch only. For example, William H. Cheney had bought twenty-six hours of Cram & Van Leuven water as far back as February 27, 1884, with Cram & Van Leuven permission to divert it into the North Fork Ditch at the Divide. He had hoped to be allowed to run it in the lower part of the ditch. It was not, however, till January 20, 1891, seven years later, that the North Fork Company granted this permission. He then was given the right to run these twenty-six hours of water in their ditch from the Cram & Van Leuven Divide to the head of the ditch built by the Highland Ditch Company, he to pay $791.34 for the privilege.

This Highland Ditch Company was an organization formed only a short time before. It will be remembered that when in the fall of 1883 it had been agreed that the Judson-Brown Ditch should be enlarged to a capacity of 1500 inches it should be carried north through the San Andreas Fault Ridge through a tunnel on what was then the Cook property. It was then to make the shortest possible detour in crossing City Creek Wash, and return to Highland Avenue to run along that thoroughfare to a terminus at Palm Avenue. The construction of a high li ‘ ne at the base of the mountains was left to such owners of land above Highland Avenue as would be benefited by it.

It was not, however, until 1888 that the owners of land above Highland Avenue took definite action. On February 10 of that year, the Highland Ditch Company was formed as a corporation, with its main objective the building of a canal along the mountain base to carry water to irrigate lands in West Highland between the mountains and Highland Avenue. The leaders in the project were Seth Marshall and A. E. Sterling, representatives of large holders of North Fork Water Company stock and of lands in the West Highland area.

The canal tapped the North Fork Ditch in East Highlands, just below the deep cut made across the San Andreas Fault Ridge to re-

place the tunnel, and spanned City Creek Wash in a long flume at the mouth of City Creek Canyon, well above the creek channel. In 1892, this ditch was sold to the Bear Valley Irrigation Company, successors to the Bear Valley Land and Water Company since December 11, 1890. The North Fork Company owned no share in this

ditch.

Other changes occurred in the general situation, and finally, in March, 1925, the Cram & Van Leuven people moved to merge completely with the North Fork Company. All Cram & Van Leuven stock was transferred to the North Fork, in exchange for North Fork certificates representing the right to use of an amount of water equivalent in value. At the same time, the Cram & Van Leuven group started proceedings for dissolution as a corporation. With the union of the two companies, the provisions that had been inserted in the articles of incorporation of the North Fork Company forty years before went into effect.

The labor and money spent in constructing the ditches discussed in these pages were expended with two main objectives in view: of bringing new lands under irrigation and production, and of decreasing the loss of water through seepage and evaporation. The Sunnyside Ditch, on the south side of the Santa Ana River, the high-line ditch on the north side built for the North Fork-Cram & Van Leuven people, and the Highland Ditch Company's canal are examples of construction with the first purpose in mind, although in the first two of these cases the second aim was in mind also to no slight extent.

The prevention of loss of water through seepage and evaporation was achieved in various ways. A large amount that would otherwise have sunk among the boulders and gravel of the river bed during the run from the canyon mouth downward was saved by turning the flow into ditches; for example, when the North Fork water owners began using the Cram & Van Leuven ditch, in 1865; when Timber Settlement water flowing in open river channels was transferred to the Berry Roberts Ditch, in 1873-75; and when this same water was transferred to the new and superior Sunnyside Ditch, in 1878. Later, crude water channels that had been dug from the canyon mouth were paved and cemented-a costly proceeding in those days of high-priced cement. Finally, some ditches were abandoned altogether, and the water was carried in concrete or steel pipes laid underground.

The increased supplies of water obtained by diverting the river flow into ditches might have been legally objected to by users of Santa Ana River water below San Bernardino Valley at the time; but no protests were raised, and long years of uncontested use validated all claims and rights of Upper San Bernardino Valley water users.

Frequent quotations from testimony given in the lawsuit, Hewitt vs. Story, have appeared in the preceding pages, and some information concerning this suit would seem to be in order. Isaac L. Hewitt, an elderly and highly estimable gentleman, came to Redlands in the 1880's with the idea of establishing his son there. He purchased a considerable amount of agricultural land and planned to irrigate it in part with waste water that had been part of the Berry Roberts Ditch flow

in earlier years. Unfortunately, his understanding of the extent of the rights in this long-abandoned waterway was faulty, and he soon found himself in difficulties. He was sincere and firm in his beliefs, however, and determined to secure that to which he thought he was entitled, through court action. The suit was the result.

On October 25, 1887, he filed his complaint against the more than eighty individuals and corporations that claimed an interest in the waters of the Santa Ana River in the eastern part of the San Bernardino Valley, averring that at some date subsequent to March 10, 1869, certain parties, his predecessors in interest, acting under the laws of California, had constructed the Berry Roberts Ditch and had become possessed of an exclusive right and title to the continuous use of five hundred inches of Santa Ana River water without diminution except when prior rights arose. He further averred that when the Berry Roberts Ditch was constructed and the water rights in it were established, the North Fork Water Company or its predecessors in interest, and the South Fork Ditch and the Sunnyside Division thereof or their predecessors in interest, were the only ones that had prior rights in the river, and that these rights involved not more than two hundred inches for each of the two groups. For some

reason, the Cram & Van Leuven rights, adjudicated in 1861, were not mentioned.

Mr. Hewitt claimed also that the Bear Valley dam was diverting water that would naturally flow into the Santa Ana River greatly in excess of the amounts lawfully belonging to any prior appropriators, water that would rank in the San Bernardino Valley as waste water. He asked the court to rule on twelve questions raised in his complaint and for an injunction, should the court find in his favor. His object was evidently to restrict utilization of water rights in the ditches leading from the mouth of Santa Ana Canyon to whatever amounts of water -had been diverted from the river to the Timber and North Fork Ditches in 1856, and to put the Bear Valley dam out of commission.

The trial that followed, in the United States Circuit Court in Los Angeles, dragged along for years, one of the famous water suits in Southern California. Immense amounts of information regarding the origin and development of water rights in the Santa Ana River in the eastern part of the San Bernardino Valley were secured. Many persons familiar with these rights and their use from the beginning were still living and gave their testimony. Original records of property transactions in the area involved, pertinent extracts from the minutes of the board of water commissioners of San Bernardino County, maps platted from notes of recent surveys showing location of the ditches under discussion, records of water measurements by engineers, water tickets showing the distribution of water to users, and many other documents were filed as exhibits. Famous water lawyers from Los Angeles and San Francisco, and the ablest members of the local bar conducted the trial, and the printed transcripts of proceedings filled two large volumes. Finally, in 1892, the Court decision was rendered to the effect that any rights to waste water that owners of the Berry Roberts Ditch might once have owned had lapsed through disuse and abandonment before the suit ever began, and it was therefore unnecessary to rule upon any of the other questions raised in the com-

plaint. The decision regarding the abandonment of the rights was sustained by the United States Circuit Court of Appeals. Had this abandonment not been proved, the suit might have disturbed seriously the irrigation set up of the North and South Fork and the Bear Valley systems.

The cost of the suit to all parties concerned was very great, but it stabilized water rights in the East San Bernardino Valley, and as a result of it a very complete collection of documentary material concerning these rights remains, a collection invaluable to historians and all other persons concerned with such data.

Witnesses and attorneys in the above suit frequently referred to the Sunnyside and the re-named Berry Roberts Ditch as the “South Fork System”. In conducting the trial attorneys on both sides sought to have all testimony regarding size of streams and flow in ditches translated into terms of inches of water under.a pressure of four inches in order to permit comparisons under a uniform standard. It should be remembered, however, that users of water in those early ditches knew nothing about the scientific standards of water measurement that are in vogue today. They dealt only in whole streams or fractions of streams, and the measurements were of necessity more or less rough. It was not until delivery of a definite number of inches of water during the irrigating season was made under an agreement reached in 1885 with the Bear Valley Company that users of water from the river began to think of measuring definite quantities of irrigation water. The recapitulation which follows will show the unscientific methods that prevailed prior to that time: In 1856, when the Santa Ana River water was first diverted, all the flow of the river during the irrigation season was taken from, its bed, two-thirds for the Timber Ditch and one-third for the North Fork Ditch. In 1861, a court upheld a claim made by the Cram & Van Leuven Ditch owners and allotted then one-sixth of the river flow. From 1861 to 1879, owners of rights in the Timber, or South Fork, Ditch laid claim to fiveninths of the river. In 1879, the water commissioners ruled that the South

Fork should have one-half of the flow at the canyon mouth, and the North Fork-Cram & Van Leuven people the other half.

The agreement between the North Fork-Cram & Van Leuven Ditch owners and the Bear Valley Company, in 1885, provided for the first time a definite schedule for water users, in inches of water. From then on to the present day this modern, scientific method of measuring water has been used, from June 1 to November 30 of each year. In other months of the year the old, primitive practice prevails, and of the one-half of the river at the canyon mouth to which the North Fork-Cram & Van Leuven people had the right, they retain onefourth and the Bear Valley Company one-fourth.

The one-fourth of the river belonging to the North Fork Company during the months when no schedule is maintained has often been made the basis for trades in which the Bear Valley Company has received extra river water in those months in exchange for abovedescribed schedule deliveries to the North Fork in the regular irrigating months. The North Fork Company has also used a portion of this

fourth of the river in spreading, winter water on lands. adjacent to wells it has sunk in the Santa Ana wash.

In January, 1916, a heavy rainstorm destroyed the section of the North Fork Ditch that crossed City Creek wash some distance below the mouth of the canyon at a point where the wash was much wider. The Bear Valley Company owned a half-interest in this ditch, and instead of rebuilding it on the line that had proved to be so hazardous, the Bear Valley and North Fork Companies utilized the ditch bought from the Highland Ditch Company, ran the water in it from itshead to a new division point slightly west of the long flume over City Creek, and abandoned the old line across the wash. The North Fork Company built a connecting ditch between the new divide and the old ditch on the west side of the creek.

In 1947, the long flume over City Creek was replaced by an inverted siphon installed below the bed of the creek.

It has been stated earlier in this bulletin that a few of the persons actively interested in the development of the water supply for the Highland and East Highland area also visualized the desirability of spreading water during the winter and when not needed during the irrigation seasons. Such water when spread would sink into the gravels and would thus percolate to the ground-waters rather than running off in the river channel directly to the ocean. Mr. Seth Marshall was one of those who had encouraged such an idea at the time the North Fork Ditch was being enlarged jn 1884. Also persons in others areas along the Santa Ana River began to see the desirability of water spreading, too. However, it was not until twenty-five years later that an organization was formed for the specific purpose of water spreading.

Men in the three counties of Riverside, San Bernardino and Orange, charged with the duty of maintaining water supplies, formed an organization in 1907 called the “Tri-Counties Reforestation Committee”. The organization had for its purpose the protection of th,,~ growth covering the watershed of the San Bernardino Mountains, which growth was being gradually destroyed by fires. This organization secured the withdrawal from entry of 960 acres of Government land on the debris cone of the upper Santa Ana River, the bill being approved by the United States Congress on February 20, 1909. This land was situated along the river channel starting at and extending westward from the mouth of the Santa Ana River where it flowed

out of the mountains.

About this time Mr. W. E. Pedley and Professor Hilgard of the University of California suggested that flood water could be diverted from the main channel onto the debris cone of the upper Santa Ana River and sunk into the ground. They claimed that this would result in replenishing the sources of supply in San Bernardino County, particularly the artesian basin, and that by so doing the natural flow from streams and artesian wells would be regulated, with the result that the use of water from these sources on the irrigated area in

San Bernardino and Riverside Counties, irrigated from the Santa Ana

River, would bring about more uniform flow of water of t , he Santa

Ana River into Orange County. These men of the Tri-Counties com

mittee realized that they had a mutual interest in preventing these

flood waters from escaping into the ocean and that work could be

carried on to better advantage through a mutual non-profit organ

ization than individually.

, A sub-committee of t he Tri-Counties Reforestation Committee was formed for the purpose of establishing a permanent organization for the spreading of the flood waters of the Santa Ana River. This sub-committee met in Riverside on April 20, 1909 with the following persons present: Seth Marshall, H. H. Garstin, E. M. Lyon, C. A. Tripp, and E. J. Yokam of San Bernardino County; W. G. Fraser, Francis Cuttle and E. 0. Richard of Riverside County, and William McLaughlin, M. Nisson, E. E. Keech of Orange County. The meeting was called to order by Chairman Keech who outlined his ideas on the formation of,a corporation for the spreading of water and spoke of the large extent to which water might be spread. The group voted that a corporation be formed and that representation consist of three members from each of the three counties. They further agreed that the corporation should be a mutual organization and that the scope of the organization be broad enough tocover the spreading of the flood waters of the Santa Ana River and its tributaries from the San Bernardino Mountains to the Santa Ana Mountains.

The corporation was organized in Riverside as of June 2, 1909 with the name “Water Conservation Association.” The Directors selected were Herbert H. Garstin of Redlands, George M. Cooley of San Bernardino, and Kenneth McRae of Rialto, of San Bernardino County; W. G. Fraser, E. O. Richard and Francis Cuttle from Riverside in Riverside County and William McLaughlin of Anaheim, E. E. Keech of Santa Ana and H. Nisson of Santa Ana, all of Orange County.

It was mutually understood and agreed between the entrepreneurs in this matter that only flood and storm waters should be diverted and sunk into the ground. With this in mind the by-laws provided that no water should be diverted and sunk until and unless water was flowing in the Santa Ana River at the Olive Bridge in Orange County, the idea being that Orange County was entitled to have water flowing in the Santa Ana River channel below lower Santa Ana Canyon so that said water would percolate into the ground and thus recharge the ground-waters of Orange County, from which much water was being pumped. At a later time, at the request of members from Orange County on the Board of Directors of the Water Conservation Association, these by-laws were changed to read that no waters were to be diverted or sunk from the upper Santa Ana River until and unless water was flowing at the Chapman Avenue Bridge in Orange County.

Records of the Water Conservation Association show that water spreading has been carried on since 1911 at the mouth of the Santa Ana River where it flows out of the mountains. On October 6, 1911 the Water Conservation Association published and posted a notice to appropriate a flow of 15,000 miners inches from winter flood waters of the Santa Ana River for the purpose of conserving said waters by spreading it over certain lands near the mouth of Santa Ana Canyon near Mentone.

The first work on the debris cone on the upper Santa Ana River was a crude boulder dam placed in the channel of the river with an open ditch to carry water onto the spreading grounds of the debris cone. This ditch had openings at different points to permit water to flow from it onto the adjoining area of sand, boulders and gravel. At each recurring stage of high water the boulder dam was washed away and subsequently would be replaced.

In the year 1920 the Water Conservation Association built a Pratt Dam of angle iron and wire which replaced the boulder dam. This dam which was downstream about one-half mile from the previous dam was more successful and withstood the onslaught of floods for many years. The first ditch had a slight gradient and later the Association built contour ditches paralleling each other across the debris cone. These crude means of diversion were later abandoned when a permanent diversion weir was constructed in 1930.

This permanent diversion weir was a low rubble-concrete dam built across the river channel just upstream from the mouth of the canyon near the Southern California Edison Company's Santa Ana Power House No. 3. Since then the water has been diverted by the weir dam and carried into a concrete channel and open unlined canal to deliver water to all of the contour ditches of the spreading grounds.

The expense of operating the Water Conservation Association was carried by many organizations and also at first a few individuals, including various water companies in each of the three counties and also the cities of San Bernardino, Riverside and Redlands. The Boards of Supervisors of each of the three counties also contributed with county funds at least part of the time with the view that such water spreading benefited a large number of property owners and taxpayers on the valley lands.

The largest quantity of water which was diverted and spread was in the winter of 1921-22 in which over 80,000 acre feet of water was diverted. In a few of the years during the drought which lasted from 1922-23 to 1936 no water was spread because of the provision that water must be passing the bridge in Orange County.

It was realized by the Water Conservation Association that some right should be established to the water which they were spreading; therefore, the Association on February 18, 1921, submitted application No. 2217 to the Division of Water Resources of the State of California for a filing on 48,000 acre-feet of water to be spread between January 1st and June 30th of each year. This diversion from the Santa Ana River channel was made into what was called The Richey Ditch to the spreading grounds; the point of diversion was about one-half mile below the Southern California Edison Company power house at the mouth of the canyon. Subsequently, the Association filed application No. 4807, on October 21, 1925, for 250,000 acre-feet of additional water also to bd spread at the mouth of the canyon where the river flows out of the mountains.

The Division of Water Resources granted the Water Conservation Association permits under which water spreading could be carried on until such time as the applications were acted on and licenses granted. The applications were unusual because such a license had not previously been applied for, under which water diverted was to be spread on land and sunk into the ground so as to percolate to the groundwaters from which it would be put to beneficial use at some later date; and as a result considerable correspondence was written over a period of many years concerning these applications.

It was not until 1946 that final action was taken on these applications. Licenses No. 2831 and No. 2832 were issued by the Division of Water Resources representing the final confirmation of the rights ?f appropriation, the

application for which had been initiated approximately 25 years previously, and the actual spreading of such waters having begun 35 years before.

Because of the fact that the large amounts of water as originally applied for were not being spread, the final amounts allocated under the state licenses were considerably less than the amounts stated in the applications. License No. 2831 granted a right to the diversion and spreading of 8300 acre-feet per annuin and License No. 2832 a right to 2100 acre-feet per annum, both of them subject to already existing rights. The priority of rights dated from February 18, 1921 for License 2831 and from October 21, 1925 for License 2832. As finally iSsued on June 17, 1946, these licenses were granted to the San Bernardino Valley Water Conservation District, which by then had taken over the work of water spreading, and had, on May 15, 194,2, been assigned all rights in permits and applications by the Water Conservation Association. Limitations on water spreading were imposed by certain litigation (known as the Irvine Suit) which will be discussed in later paragraphs, but the rights as granted under the licenses issued by the Division of Water Resources were not governed by the court decree of the Irvine Suit.

In 1931 many of the property owners in the San Bernaxdino Valley east of the City of San Bernardino had become alarmed at the continual lowering of the water levels in their wells because of the drought and waste of water and especially because of increasing exportation of water from the Basin. The drop of the water levels continued through the summer and by fall the alarm became so great that public meetings were called within the valley to consider the situation. Under the capable leadership of George R. Segar and W. Z. Henry, several public meetings were held and attended by many residents and property owners in the valley. It was finally decided to organize a public water conservation district in order to provide both an organization and financial means to make a study of the situation and to determine the proper course to pursue.

On October 13, 1931 a petition signed by a large number of property owners and residents of the valley was presented to the San Bernardino County Board of Supervisors requesting the formation of a water conservation district. Several extended hearings were held

before the Board of Supervisors during which strenuous protest against the organization of the District was made by several of the Riverside County water interests. Finally the Board of Supervisors decided to revise the boundaries of the proposed district so as to eliminate from the proposed district a portion of the property which was owned by the Riverside County water interests, and to then submit the matter to an election within the remaining territory of the proposed district. On December 30, 1931,- an election was held and the formation of the District approved. At the same time seven Directors were elected as members of the Board consisting of W. Z. Henry, F. B. Hewitt, B. E. Barton, Floyd Kolb, R. C. Gerber, C. L. Myers and Fred Segar.

The first meeting of the Directors of the San Bernardino Valley Water Conservation District was held on January 19, 1932 with Mr. Gerber being elected President, Mr. Henry, Vice President and Mr. Hewitt, Secretary. At that time the territory within the new District included only about 12,600 acres located in the valley east of the City of San Bernardino. The directors engaged an engineer and began to make a survey and study of the water basin. A number of wells within the Valley were measured regularly and well records compiled.

Within a few years it became apparent that the area of the District should be enlarged. Under the able leadership of J. J. Prendergast and E. D. Patterson this need for an enlarged District was brought to the attention of the people in the eastern part of the valley; as a result, in an election in 1935 the boundaries of the District were expanded to include a total of 46,950 acres. Mr. E. D. Patterson, who lived in Crafton, was elected president

of the enlarged District, the territory of which was bounded on the north by the foothills of the San Bernardino Mountains, on the west by the City of San Bernardino, on the south by an irregular line including Loma Linda and the City of Redlands, and on the east to the Santa Ana and Mill Creek Canyons. This area includes a major portion of what is commonly known as the Bunker Hill Basin.

The enlargement of the District permitted obtaining additional funds for conservation work without creating a burden on the taxpayers and also gave an organization which represented and could act for all the people in the Bunker Hill Basin with the exception of most of the City of San Bernardino and territory to its north and northwest. Various surveys and studies of the water situation within the District were commenced and records obtained and compiled. The various water rights within the basin and of the exporters from the basin were studied and numerous conferences held in regard to use of water by the many users. Various methods and ways of conserving water were also carefully studied. The District was instrumental in having wells sealed off in the artesian area where some wells had been allowed to flow unchecked, creating an unnecessary waste of water from the basin.

The San Bernardino Valley Water Conservation District also began to take an active part in spreading water and conserving any runoff not necessary for irrigation. During 1935 the District took over

the spreading of water on the Mill Creek debris cone which previously had been done by the East Lugonia Mutual Water Company and the City of Redlands.

During 1937 the District started participating in the expense in the water spreading being carried on by the Water Conservation Association on the Santa Ana River debris cone. Eventually the District took over all the responsibility and work of spreading water when the Water Conservation Association withdrew from all activity because of the heavy expense of fighting the Irvine suit.

Under a legislative appropriation in 1931 $400,000 of State money to be matched by local funds was made available for water conservation and flood control works in San Bernardino County. This expansion program of the water spreading facilities so alarmed Mr. James Irvine, owner of 19% of the total acreage in Orange County at that time, that he had his engineer, C. Roy Browning, together with engineers F. C. Finkle and W. P. Rowe, make a report on the spreading operations in San Bernardino County. Mr. Irvine and other agricultural interests were apprehensive of this increased spreading program because they were dependent for their water supply on the underground basin in Orange County supplied by the Santa Ana River. Also, the Board of Supervisors of Orange County had asked their consulting engineer, G. A. Elliott of San Francisco, to report on the effect of spreading in the San Bernardino Valley on the water supply of Orange County.

In 1929 Orange County along with Riverside and San Bernardino Counties had allotted $20,000 toward the construction by the Water Conservation Association of the permanent weir diversion dam which has been previously referred to and the headgate diversion structure for the water spreading grounds at the mouth of the Santa Ana Canyon northeast of Mentone. When approached on the matter of continuing their contributions toward enlarging the water spreading works they retained Mr. Elliott to appraise the situation. His report filed in July, 1932 recommended that Orange County “not only not participate in the proposed spreading plan in the upper basin but should prevent, if possible, any further conservation in that area until an equitable arrangement could be agreed to by all parties in interest”. This report by Mr. Elliott together with the findings of his own engineer resulted in a protest being filed by Mr. Irvine in July, 1932 against the Water Conservation Association and also parties handling spreading on Lytle Creek. The protest was against any diversions for water spreading and

against enlarging of the spreading works.

Attempts were made by both the Water Conservation Association and the Lytle Creek groups to explain what they felt was the true picture to Mr. Irvine but these were of no avail. The Irvine Company (a West Virginia corporation) filed suit in November, 1932 in the Federal Court in Los Angeles naming as defendants all parties connected with the spreading of water on the Santa Ana, Mill Creek, and Lytle Creek debris cones.

The complaint set forth two causes of action: the first is based

on the fact that the Irvine Company, being a riparian owner (its property borders the Santa Ana River channel for over two miles in Orange County), is entitled to have the flow reach its land undiminished in quantity; the second being that the waters of the Santa Ana River replenish the underground basin in Orange County and that the Company by means of 80 wells secured a large proportion of its water from this basin.

After several meetings of the defendants, it was tacitly agreed that the Water Conservation Association would proceed with efforts to reach a compromise or settlement, as to the spreading on the Santa Ana debris cone; the Mill Creek and Lytle Creek defendants would in the meantime hold back in their negotiations until the outcome of the Santa Ana negotiations. This was done because of the feeling of the Water Conservation Association that their interests and rights were so different from those of Mill Creek and Lytle Creek that they preferred to work out their own defense. To this end they employed Mr. Chauncy L. McFarland of Riverside as their special counsel. The Mill Creek and the Lytle Creek interests retained the firm of Surr and Hellyer to represent them.

The Water Conservation Association offered to limit spreading to the first 200 cubic feet per second at the Mentone gauge until the flow reached 1000 cubic feet per second, then they would spread larger amounts. Data supporting this propo~ition was worked up by Mr. A. L. Sonderegger, their engineer, and turned over to the Irvine representatives, but no progress was made toward settlement.

Meanwhile, in June, 1933, the Orange County Water District was organized, embracing some 130,000 acres within its boundaries; some of its constituents felt that the curtailment of water-spreading in San Bernardino County was of such vital concern to well owners of Orange County that the Water District should enter the suit as an intervenor and that it should take over the prosecution of the suit. Such arrangements were eventually worked out, the District reimbursing the Irvine Company for a major portion of the money they had already expended.

While these arrangements were in progress negotiations had been suspended but in 1935 they were resumed. The Orange County Water District proposed that the natural flow of the river below Prado be maintained. It was their contention that to obtain maximum absorption in the Santa Ana River channel below Prado, flood flows were necessary for flushing into the ocean the silt and debris which is deposited in the river channel during low stages of runoff. To this end they proposed that no spreading be done on the upper Santa Ana River and tributaries until 2000 cubic feet per second was passing Tippecanoe Street at the Gage Canal headgate north of Loma Linda. A flow of this magnitude occurs on the average of less than one day each year and if the Water Conservation Association had agreed to such a proposition, it would have precluded all spreading. As a result conferences held to discuss this proposition made no apparent headway.

On September 3, 1935, the San Bernardino Valley Water Conservation District, with a view to protecting the future water supply of the San Bernardino Basin (also known as the Bunker Hill Basin),

requested that the Water Conservation Association submit any proposed stipulation or settlement to them before

final adoption.

By January, 1936 the negotiations had reached a stalemate, propositions having been made by both sides which were not acceptable to the others. The Irvine representatives next made a~proposal, the essence of which was to allow only the spreading of low flows, those which would be absorbed in the basin naturally, and also the peak of any major flood.

On September 11, 1937, a stipulation was filed in the court agreeing that the Orange County Water District should enter the case as an intervenor and also that three water masters should be appointed to make a study of the effect of spreading, runoff, absorption, waste into the ocean, et cetera. Also, an agreement was made in which a five-year trial period would be conducted, using a tentative schedule of spreading during that period, before any conclusion or final settlement be drawn.

Under the five-year-study plan the plaintiff and defendant were each to nominate one master and were then to suggest two other engineers from whom the Court would choose a third. The Orange County interests chose Mr. Paul Bailey while the Water Conservation Association chose Mr. Francis Cuttle, their president. However, due to failing health Mr. Cuttle resigned and Mr. R. D. Skelley was nominated in his place. The Court drew the name of Mr. George Swendsen of Long Beach as the third master from among the names which included Mr. Franklin Thomas, Mr. E. R. Bowen, and Mr. N. H. Hall. This selection of the third master was made in February, 1939, although the spreading had been carried out under the supervision of Masters Bailey and Skelley subsequent to 1937.

During 1938 and 1939 conferences were held trying to settle the dispute on the basis under which the five-year-study plan was operating, permitting spreading at all times when the flow of the river and canals at the Mentone gauge was less than 110 cubic feet per second. Also included in the proposed settlement was the provision that in no one season would the amount of water spread exceed 11,000 acre-feet.

By May of 1940 the water companies who comprised the principal contributors to the Water Conservation Association had reached their limit of expense in defending the suit and felt that a settlement along these lines was as satisfactory a deal as could be made. Beginning in 1937 the San Bernardino Valley Water Conservation District had assumed half of the expense of operating the spreading works on the Santa Ana debris cone; their Board of Directors realized that unless they took an active part in any proposed compromise the rights to spread water might be seriously curtailed for all time to come. A negotiating committee composed of E. D. Patterson, James Cram, J. J. Prendergast, James L. King and Horace P. Hinckley was appointed by the Board and set to work studying different proposals. The committee felt the proposal of a maximum of 11,000 acre feet contained too severe a restriction on amount spread. However, their

counter proposals were not acceptable to the Orange County interests and these negotiations also collapsed.

Meanwhile, the Water Masters had been diligently at work gathering data concerning the questions of absorption and waste; they filed their report with the Court in May, 1940. This study, although supposed to cover the effects of spreading in the San Bernardino Basin, dwelt almost exclusively with the evapo-transpiration losses in the damp lands at the lower end of the basin. The San Bernardino Valley interests felt that the report did not give a complete picture of the situation and did not even cover the principal benefits derived from water spreading on the Santa Ana cone. This report, more than anything else, awakened the water users of the San Bernardino Valley to the seriousness of the demands being made by Orange County; the only solution seemed to be to discontinue negotiations and prepare for trial of this case.

In October, 1940, the, Water Conservation Association resolved to deed all its property and water rights to the San Bernardino Valley Water Conservation District and then to disincorporate as soon as the suit was settled.

The Orange County Water District was standing firm in their contention that control of spreading was necessary in order to allow major floods to reach Orange County and flush the silt and debris in the channel into the ocean. To effect this control they contended, in line with the Water Masters report, that the spreading should be regulated by the elevation of the ground-water table in the damp land area east of San Bernardino. The San Bernardino Valley Water Conservation District felt that the height of the water table in that area was affected by pumping in the area, runoff of City Creek and Twin Creek, and other factors not related to spreading on the Santa Ana cone. Both sides were reluctant to have the Water Masters proceed with more reports because of the cost. Throughout 1941 the negotiating committee of the Water Conservation District continued to consider suggestions and study what would be a just and fair division of the winter runoff. They concluded that if the amount of diversion for spreading in cubic feet per second was allowed to be increased they could reduce the total annual amount which would be spread to advantage.

The court decided in January 1942 that the Water Masters would either have to proceed or a compromise be agreed upon within 60 days. The Water Conservation District, with the backing of the major water companies in the Redlands-Highlands area, decided to stand firm in protecting its right to spread all normal flows of the Santa Ana River. This attitude did much to temper the Orange County demands. In March, 1942, an agreement was signed calling for a stipulated judgment.

The judgment as finally rendered may be summarized as placing three limitations on the Santa Ana cone spreading as follows.

1. Spreading is permitted at any time when the combined flow of the Santa Ana River and canals at the mouth of the Santa Ana Canyon, northeast of Mentone, is less than 130 cubic feet per second.

This represents a flow of 6500 miners inches. When the flow exceeds 130 cubic feet per second spreading must cease until the flow passing or reaching Prado is 3000 cubic feet per second. Spreading may then be resumed again until the flow at Prado gets down to 500 cubic feet per second. If a second flood occurs in the season spreading may be practiced when the flow at Prado reaches 3000 cubic feet per second and until it declines to 700 cubic feet per second.

2. Total diversions onto the spreading grounds in any one season are not to exceed 9000 acre-feet.

3. When the water level in a majority of 13 designated wells rises to the high level which records show was attained in 1916, then all spreading shall cease until such time as the water level again drops below that 1916 elevation. The thirteen wells designated in this provision are located in various parts of what was considered the zone of recharge of the eastern part of the San Bernardino Valley, none of them being wells in the artesian area.

To judge what effect this stipulated judgment might have on the operations of spreading and of the water supply of the San Bernardino Valley the following is of interest. Since 1912, when the present Bear Valley dam was completed, the number of days when the flow of the Santa Ana River and canals has been in excess of 130 cubic feet per second has averaged 41 days each year. Of these 41 days there would be 5 days when spreading could be practiced under the provisions of size of flood flow at Prado. The average season of spreading water is 160 days each year. As a general average there would be 36 days out of this spreading season when water could not be diverted. The flood flow provision which prohibits spreading until 3000 cubic feet per second reached Prado was a concession to Orange County and was only agreed to because of their insistence that such a flow was necessary to flush the channel. Also the second item, limiting diversions to 9000 acre-feet per year, is of definite advantage to the lower river interests. A review of the amounts of water spread each year from 1912 until 1950

shows that in seven years out of the thirty prior to the judgment the amount spread exceeded 9000 acrefeet, but.the average spread was only 8475 acre-feet per year. The third restriction was agreed to without serious question because much of the area east of San Bernardino had become developed into useful land and return of the ground-water table to the high level of 1916 might seriously inconvenience the present uses of the land. The limitation against spreading water during the peaks of floods is not as severe as it might seem, for the Water Conservation District, which handles the water spreading, has found that the flood flows are usually too full of silt and debris to be spread without silting up the spreading grounds and spreading basins rapidly.

H ISTORY OF THE WATER RIGHTS OF MILL CREEK

AND THE MILL CREEK ZANJA

The origin and development of rights to the water of the Santa Ana River in the East San Bernardino Valley have been discussed in the first part of this volume. There is, however, another set of important water rights in the eastern part of the Valley distinct from those of the Santa Ana River-the rights centering in Mill Creek and the locally-famous Mill Creek Zanja.

This zanja, about a dozen miles in length, is a historic waterway, by far the oldest irrigating ditch in San Bernardino County. It dates back to the year 1819, when the Fathers of Mission San Gabriel egan working out plans for giving instruction in agriculture to the Indians of the Guachama Rancheria on the flat west of what is now Redlands, and established the Mission Rancho San Bernardino. Years later, when San Bernardino City came into being under the Mormons, the region about Guachama became known as “Old San Bernardino”, and even today it is often referred to as “Mission District”.

In starting agriculture among the Indians it was necessary first of all to secure water for the lands on which crops were to be grown. One Pedro klvarez, a man evidently possessed of some engineering knowledge and skill, was brought from San Gabriel to lay out a zanja, or water ditch-a humble forerunner of the elaborate water systems of the San Bernardino Valley of today.

Using present day names, the head, or “intake”, of the zanja was slightly more than a mile below the mouth of Mill Creek Canyon and four miles east of Mentone, just below the spur of the Crafton Hills that juts out toward the Southern California Edison Company’s Power House No. 1 and the California Trout Company fishing ponds. Alvarez constructed a dam across the creek at this point to raise the water sufficiently to enable him to divert the flow into a crude waterway he worked out to bring the stream to the lands to be irrigated.

The actual labor was performed by Guachama Indians under their headman, Solano, a sub-chief. Legend has it that the implements used in the digging were shoulder blades of slaughtered cattle, and that the earth to be moved was carried in large, bowl-shaped baskets on the heads of Indian women and piled along the ditch line to form a sort of embankment. The zanja was completed in time for seed sowing and planting in 1820.

During the first miles of its course, the zanja ran in a natural depression along the base of the Crafton Hills; and as the grade there was and still is rather sharp, the current was often swift, like that of a mountain stream. Whenever it had to cross gullies or washes, a dam was built to keep encroaching waters from entering. Needless to say, these dams frequently failed in their object during storms and the zanja suffered damage. When a rise of

ground was encountered,

considerable excavating was necessary, and when a depression occurred the water was allowed to fill the "sink7 and then flow out and onward.

In the vicinity of Crafton the current slowed down somewhat, and with many windings the zanja approached what is now Redlands, skirting the south side of the University campus, and meandering through Sylvan Park and the lands occupied by Redlands itself. West of Texas Street it turned southward and ran in that general direction almost to Brookside Avenue, where it again headed west and ran on to the flat beyond.

The amount of water in the zanja naturally varied according to the season of the year and the weather. In times of abundant rainfall in the mountains there was a goodly flow, while in times of scant rain the flow might be slight. Seepage throughout the year and evaporation in midsummer caused considerable loss. The zanja gave great trouble during heavy storms, -filling up with sand, great stones, even with trees washed down from the sides of Mill Creek Canyon, and with debris wherever gullies or washes intersected it. When flood waters subsided, Indians always hastened to rebuild the dams and clear away obstructions so that the water could flow again. The same procedure was necessary when the Mission Fathers were succeeded in the Valley by the Lugos, the Mormon colonizers, and other and later American pioneers. The fact that, at the very start the ditch was called a zanja seems to preclude the idea of its having been a natural waterway as was claimed in a legal controversy half a century later. From time immemorial Mill Creek had run in its own wash to empty into the Santa Ana River, and it was this creek that the Mission Fathers diverted into their own runway.

In September, 1821, Father Payeras, Comisario-Prefecto, or General Manager, of the California Missions, made an official inspection tour from San Diego to San Gabriel. Accompanied by his secretary, Fray Jos6 Sfinchez, they spent five days in the San Bernardino Valley visiting the various establishments that Mission San Gabriel was maintaining there. They viewed the recently-constructed zanja, and it is in the diary kept by Father Shnchez on the trip that the earliest known mention of this waterway occurs. The Payeras report to the Mexican government the following year, 1822, is our authority for saying that active mission work at Guachama began in 1819.

The zanja served its purpose well, and the Indians at Guachama, some two hundred in number, fared much better in the way of food because of it. In 1826, only six years after its construction, the noted explorer, Jedediah Strong Smith, and his party appeared at the Rancho San Bernardino headquarters with an order from the authorities at. Mission San Gabriel for food and clothing. They had reached California ragged and starving after a terrible trip over the Mojave Desert, and although they had applied first at San Gabriel, it was to Rancho San Bernardino that they were sent for relief. Smith's secretary tells how they obtained corn, peas, parched meal, and "flour of wheat" from the mayordomo there along with other supplies. The reference to flour of wheat suggests that there was a mill for grind-

ing grains on the rancho even then. The zanja would have supplied water power for it.

The zanja ran as far west as the large adobe structure erected at Guachama to serve as a storehouse and residence for the overseer, or mayordomo, who was San Gabriel's representative in this region. The location, now indicated by a marker placed by the Redlands Chapter of the Daughters of the American Revolution, is on Mission Road, or Cottonwood Row, about a quarter of, a mile east of the old Anson Van Leuven brick residence. The adobe structure known as the asistencia, on what is today called "Barton Hill", was begun some ten years later.

During the Mission Period zanja water was used extensively on land west of the asistencia site, the mission

lands east of it not being cultivated. Waste water ran off in a ditch running southwest and emptying into what Americans later called "Dry Creek"-the "San Timoteo Creek" of today. A later outlet swerved northwest and entered Dry Creek near what is now Loma Linda. San Gabriel Mission abandoned its enterprises in the San Bernardino Valley in 1834, after the Mexican Government had secularized all mission holdings in California, and probably any rights to water in the Valley the Mission had acquired under Spanish law had lapsed by 1839 when the Lugo families appeared on the scene.

The Mexican government was interested in placing settlers on the lands they had taken from the missions, and the Lugos-Jos6 del Carmen Lugo at their head-launched a colonizing scheme in the Valley in 1839. One of the persons entering into the undertaking was Francisco Alvarado who, a boy of ten, had come to the Valley in the middle 1820's when his father was appointed mayordomo of the Mission Rancho. Under the colonizing scheme he cultivated lands around the old storehouse which had once been his home, using zanja water to irrigate them.

Another colonist was Maria Armenta, an unusually forceful and energetic woman described by one writer as a sort of Amazon. She and her husband, Jos6 Bermudez, thirty years older, had been retainers of a sort in the Lugo family f or years, and they located on land in what is now Redlands near the mouth of Reservoir Canyon. They planted it rather extensively to vineyard, and brought water to irrigate it from the zanja in a ditch still referred to as the Maria Armenta Ditch. It tapped the zanja slightly west of the present Crafton schoolhouse.

The Lugos were sincere in their colonizing efforts, but Indians of the region were a constant annoyance and menace, and the settlers who had been brought in grew discouraged and began to leave. When it became clear after a couple of years that the enterprise was doomed to failure, the redoubtable Maria and her husband pulled up their grapevines and moved into San Timoteo Canyon, outside the area the Lugos had controlled. The remains of her ditch were visible many years afterward, and it is still indicated on water maps of the region.

The Lugos themselves remained undaunted by the depredations of the Indians, and applied for a grant of the San Bernardino Rancho

as their own property. This grant was issued in 1842, and it naturally included the zanja; but whether or not there was a "right" to Mill Creek water for irrigation was not specified. The Lugos were primarily stock raisers, and grew crops only incidentally. The zanja doubtless was little to them other than a good water supply for their cattle and horses, and the ditch must have been largely neglected. Lands east of the asistencia never previously occupied had been irrigated by Maria Armenta, with zanja water, but they had been abandoned before any new water right could have developed.

When the Lugos obtained the rancho it was their individual property and Jos6 del Carmen moved into the asistencia. He evidently utilized and irrigated land near his home for crops, for Francisco Alvarado testified in a lawsuit years later that the zanja water was taken away from the land h6 had been cultivating around the storehouse and used on lands just below the asistencia. Alvarado abandoned his cultivation when there was no longer hope of his gaining land under the colony plan, and went into the business of raising cattle.

In 1851, a colony of Mormons came down f rom the Great Salt Lake in Utah, and their leaders, Amasa M. Lyman and Charles C. Rich, bought the San Bernardino Rancho from the Lugos and Diego Sepulveda, believing that in so doing they were securing the entire San Bernardino and Yucaipa Valleys-an area comprising about eighteen square leagues. As high Church authorities and owners of the land, they had complete control of everything. Being ignorant of the Spanish language, in which the grant to the Lugos by the Mexican Government was couched, they could not know that whereas the Lugos had ranged their stock over that entire region, their grant was f or only eight leagues to be selected from the greater area, and that was all they could sell. The Mormons soon discovered their error, but it caused confusion and hardship for a time.

The first few years of Mormon occupation of the Valley were years of abundant rainfall, and immense crops of grain, mainly wheat, were raised on the uplands along the base of the San Bernardino Mountains north of what is today "Little Mountain", while ground water near the surface of the lowlands provided much damp land for summer crops and pasture. In March, 1852, Nathan C. Tenney, later Bishop Tenney, moved onto the former mission lands to take charge of Mormon farming operations on the south side of the Santa Ana River in what become known as Old San Bernardino. He made his home in the asistencia, planted the vineyard there that Dr. Benjamin Barton later acquired and enlarged, set out an orchard of some size on the land Lugo had irrigated, and seeded a goodly area on the flat to grain. Grain land here was more productive and drouth-resistant than were the lands on the north side of the Valley, and water was needed only for the orchard, the vineyard, and some summer crops. In 1854, Lym~n reported the destruction by fire of three or four hundred acres of grain on the south side of the river, through the carelessness of a camper. This was doubtless a part of the grain Tenney had been cultivating, with the labor of Indians.

In 1853, San Bernardino County was formed but, probably as an economy measure, no board of supervisors was arranged for imme-

diately, and the Court of Sessions, completely under Church control, performed many of the functions of a supervisor board. In 1854, the Legislature passed an Act providing for "a board of water commissioners . . . to regulate water courses, whose duty it would be to 'apportion water to the streams in their districts among the inhabitants thereof, and authorize the construction of ditches"' when proper application was made. Such a board, in effect, was to preserve the spirit of the Spanish laws permitting appropriation of water of non-navigable streams for irrigation purpose, and the Act called for a board in eight California counties in which irrigation was essential to agriculture. Each board was a sort of Court of First Instance in authorizing water enterprises, but it was always subordinate to the District Court, and was frequently overruled. In disputed cases, final rights to water were settled by court action.

Up to this time, little law regarding water in non-navigable streams had been enacted in California, and Lyman and Rich had only vague ideas of the Spanish and Mexican laws that had prevailed in the region prior to American occupation. The land Bishop Tenney had been irrigating in Old San Bernardino was the tract below the asistencia that the Lugos had watered from the zanja. Lyman and Rich probably arranged informally with the occupants of other portions of the ex-mission land for use of the water, unmindful of the fact that irrigation on much of it had been discontinued during the ten years of Lugo ownership, and recent occupants therefore had no real right to the zanja flow. Lyman and Rich acted also without regard to the late law providing for a board of water commissioners.

The non-Mormon population in the Valley was growing, and a desire on their part for representation increased. Many Mormons even became restive. In 1855, San Bernardino County was placed under a Board of Supervisors. It was the duty of this Board to arrange for the election of a Water Commission when the voters met, in September of that year, but for some reason they did not do so.

Irrigation had not been practiced largely in the Valley owing to abundant rains; but the drouth that began, probably in the winter of 1855-56, made it supremely important. An item in a Northern California newspaper tells of a meeting that Mormon leaders and settlers held in San Bernardino in March, 1856, to plan for a ditch f rom the Santa Ana River to carry water to the former mission lands to irrigate an 800-acre grain field that would be an addition to the grain already being grown there with zanja water. However, a late rain came shortly after the meeting and the ditch idea lapsed for a time. But at a special meeting of the Supervisors, on March 3, 1856, Lafayette Shepherd and two other men had been named as a Water Commission. All three were Mormons, but they felt the responsibility of their position and displayed independence in their official acts.

While Lyman, Rich, and Ebenezer Hanks, the latter a recently acquired partner in the ranch enterprise, delayed constructing their proposed ditch to carry Santa Ana River water to their land on the south side of the river, parties who had bought land along the north side of the river realized that their land needed irrigation and objected to the proposed diversion of the river water to the south side of the

Valley. Under authority of the Water Commission, they proceeded, in May, 1856, to construct two ditches known as the Timber Ditch and the North Fork Ditch to convey to their lands the entire river flow. This was a direct challenge to the ranch proprietors, and they ignored the authority given by the Water Commission and constructed what was known as the Tenney Ditch. It tapped the river flow some five miles above the Timber-North Fork intake, and in the fall of that year Bishop Tenney turned river water into it. The owners of the ditches approved by the Water Commission protested vehemently, and Shepherd, the Commission Chairman, true to his responsibilities as a public official, built a dam in the intake of the new ditch and ordered Bishop Tenney to cease running water through it. Tenney obeyed. This action of the Water Commission was a servere rebuke to the Mormon leaders, one of the disturbing incidents in the San Bernardino colony prior to its recall to Utah.

In reality, the meeting of the ranch proprietors and the settlers in March, 1856, could have been nothing more, legally, than one for drafting a petition to the Water Commission for authority to use river water on the mission lands, and the number of persons who had a part in it must have been small. A. D. Boren, who came to Old San Bernardino in the spring of 1855, a year before this meeting, testified years later that besides Bishop Tenney, the only residents there when he arrived were Bushrod W. Wilson, two Bybee brothers, three Cram brothers and their father, and Benjamin Van Leuven and perhaps his son Anson. It is improbable that the number of residents increased to any great extent bef ore the meeting to plan f or the use of river water on the south side. Any recognition by the Water Commission of irrigators there would have been limited almost wholly to Lyman, Rich, and Hanks, since they did not issue titles to these lands till 1857; and it would have been they, in that dry year, who would have been desirous of irrigating the lands that had been abandoned in 1841 by Francisco Alvarado and therefore had not been watered for about fifteen years. In 1853, Anson Van Leuven lived for a time on the land in Old San Bernardino that later became his home place. The zanja then was carrying a small stream of water only as far as the present N. B. Hinckley property on Mission Road, and Van Leuven had to go to Dry Creek for domestic water. According to W. H. Van Leuven, a culvert was built across the road in the 18PO's to allow for an extension of the zanja to carry water to his father's home, and this was the last point to which zanja water was then taken.

In the dry period of 1856 it became necessary to irrigate grain land before seeding it, and in some cases even to flood the growing crop. For this the water in the zanja must have been utilized to the utmost, and work was doubtless needed to put it in better carrying condition. It may have been at this time that the old Maria Armenta Ditch was enlarged, probably to make possible the growing of summer crops of corn after the grain no longer required water. Indications of such cultivation between the ditch and Cajon Street in Redlands could be seen at least twenty years afterward.

Lewis F. Cram, a non-Mormon, and two of his brothers operated a furniture factory in part of the fourteen-roomed asistencia in 1854,

while the Tenney family were living in the other part. Power for the Cram tur4ing lathe was supplied by a breast-wheel placed in the "fall" of the zanja. The brothers were allowed by Lyman and Rich to use some of the land near the asistencia for crops, and water them from the zanja in return for labor they agreed to perform in improving the ditch.

Just how much land the Crams cultivated there is not known. Late in 1856 or early in 1857, they came to realize that the land they were occupying would doubtless be included in the areas selected by the Mormon leaders as part of the eight square leagues to which they were entitled, and the Crams moved to a location a few miles east on the zanja, hoping that it would prove to be Government land when the San Bernardino Rancho lines were finally settled. They construed the permission given them to utilize zanja water for irrigating purposes near the asistencia to constitute a "right", and on moving they took this right with them. They cultivated twenty or twenty-five acres in the new location, but the Mormons soon claimed this land as part of what was to be theirs and it was up to the Crams to move again. They were not the only persons who encountered such difficulty.

During this Mormon period, farmers were wont to separate their land from that of their neighbors by a row of cottonwood trees which served also as potential firewood. The course of the zanja in Mission District was marked by a row of such trees, and the road that ran along it for about a mile, now known as "Mission Road", was for years called "Cottonwood Row". In 1922, W. H. Van Leuven, son of pioneer Anson Van Leuven, when speaking before the Redlands Contemporary Club on the occasion of the so-called "Zanja Centennial", said that two of the original trees of Cottonwood Row were then standing. By 1935, but one of them remained, the other, through some lack of understanding of its historic value, having been cut down. The remaining tree was in the yard of the Leonard Van Leuven home.

In the latter part of 1857, the call came from the head of the Mormon Church in Salt Lake City for all loyal Mormons to return to Utah. More than half the Mormon settlers in the Valley obeyed, disposing of their interests here for a song. Early in 1858, Lyman, Rich, and Hanks transferred all unsold lands in the San Bernardino Ranch to Messrs. Conn, Tucker, Allen, and Coopwood, and dealings thereafter in these lands were with the new proprietors. In the fall of 1858, the Crams sold the house they had built on their second location and their "right" to use zanja water to L. F. Carpenter, the only case known to the writer when a water right in those days was regarded as a commodity that could be sold. The land the Crams had been occupying-320 acres-Mr. Carpenter had to purchase from Conn and his associates.

Much of the land along the zanja in Old San Bernardino that had been occupied by Mormons soon passed into the hands of strangers, and Conn and his partners executed deeds to hitherto uncultivated lands on the zanja above. The deeds that had been issued by Lyman, Rich, and Hanks and those now issued by Conn were similar in form and mentioned no water rights. The writer has examined a number of early deeds to property on the zanja, and in no case does he find men-

tion in them of transfers of water rights with the land sold.

When L. F. Carpenter acquired the 320 acres of land adjacent to the house he bought from the Cram brothers, H. M. Willis bought 160 acres adjoining Carpenter on the west, and George H. Crafts, Sr., acting as agent for his brother, Myron H. Crafts, bought 466 acres adjoining Carpenter on the east. The zanja ran through each of these properties. The region was often called the "Upper Settlement", and Old San Bernardino the "Lower Settlement". In the present paper the two latter terms will be used interchangeably hereafter.

Residents of Old San Bernardino admitted that Carpenter had a right to irrigate some land from the zanja as successor to the Crams, but otherwise they claimed an exclusive right to all the water of Mill Creek. Willis and Crafts denied any such absolute ownership, and claimed the right, as proprietors of lands on the zanja, to use zanja water. All three landholders in this Upper Settlement used water freely, flooding grain fields and bringing orchards and vineyards into bearing. They were active in repairing the zanja, and claimed that the people of the Lower Settlement did little if any work on the upper stretch of the line. The County Water Commissioners were apparently in sympathy with the settlers in Old San Bernardino in their claim to the entire ownership of Mill

Creek water.

It should be borne in mind that the upper part of the zanja at that time had a much greater carrying capacity than it had in the lower reaches, and when heavier rains increased the flow, grain fields could be flooded there without robbing the Lower Settlement. A wasteway from the zanja started somewhere west of the present Church Street and automatically diverted into a natural channel-possibly the one Bishop Tenney utilized years before-all water in excess of what the ditch along Cottonwood Row could carry.

There must have been some realization on the part of Old San Bernardino people that Willis and Crafts had some right to zanja water, for in 1859 Anson Van Leuven, then the zanja watermaster, prepared a water schedule for submission to the Water Commission, a schedule in which zanja water was allotted to the Carpenter ranch to irrigate 125 acres, and the remainder of the zanja flow was allotted to ten growers in Old San Bernardino who expected to irrigate 574 acres.

The 125-acre allotment to the Carpenter ranch was a somewhat disingenuous device to cover 75, 35, and 25 acres that Carpenter, Crafts, and Willis respectively planned to irrigate and did irrigate, that year. Mr. Carpenter's overseer testified in a court suit that Van Leuven had explained the arrangement to him saying, "If we don't allow the water we'll have a lawsuit, and we are not prepared f or a lawsuit." The Water Commission approved the schedule proposed, and issued a written ruling to that effect, one of the few, if not the only, ruling,as early as 1859 that has come to light. Prior to 1864, minutes ofWater. Commission meetings were not kept, and knowledge of their acts has been gained only from testimony in lawsuits or in isolated documents like the one just mentioned.

After 1864, minutes of the Water Commission meetings were required by law, and these show the regular procedure to have been pretty much as follows: upon petition of parties wishing to irrigate from a stream, the Board considered their representations and if it approved them it located a line for a ditch, determined the amount of labor and other charges to be assessed against each person who would use it, and apportioned water from it each year for the number of acres a user planned to cultivate that season, provided the acreage was not excessive.

This apportioning of water continued for years, the system being well adapted to existing conditions. Board minutes show that amounts allotted from the Timber Ditch of the Santa Ana River ranged from a supply for 242 acres in 1864 to a supply for 369 acres in 1872. It had authorized the construction of this ditch and had apportioned the water among persons who had done the digging. The Mill Creek Zanja, however, was an old ditch, and what should be done with its waters seems to have been less clear.

In 1860 Carpenter irrigated twenty-five acres of vineyard and orchard, and seeded two hundred acres more to grain, but Old San Bernardino growers would not consent to his using the amount of water, this called for. Ignoring their attitude, he and Willis and Crafts took what they needed. Upper Settlement men agreed among themselves, then, but relations with the Lower Settlement became increasingly strained. A. D. Boren testified, years later, "Carpenter and his friends gave us much trouble and annoyance-acted too disgracefully

to speak of."

The greatly increased land cultivation in later years and its devotion to orchards made night as well as day irrigating a necessity; but at this time land was used so largely for grain that night irrigation was not needed. About the year 1861 an arrangement was worked out whereby Carpenter could use zanja water from three to nine p.m. Often referred to as an "agreement", it was at first merely a proposal offered by Lower Settlement land owners as a price they were willing to pay for peace. They signed it but Carpenter did not do so, being afraid of its implications. However, he and other residents of the Upper Settlement acted in accordance with its terms. In all probability, Crafts and Willis were not invited to sign it, as water users in Old San Bernardino would not con-

cede to them any right to irrigate from the zanja at all. The Lower Settlement was apparently willing to increase the small concession previously made to Carpenter as a successor to the Crams, and were now saying, in effect, that Carpenter might take the f ull flow of the zanja one-fourth of each twenty-f our hours, in hours when they did not need it themselves. They would use it the rest of the time. The plan resembled the one put through in 1859, when water for the lands that Carpenter, Crafts, and Willis intended to irrigate that year was apportioned in the name of Carpenter alone.

When it is remembered that it took several hours for zanja water to run from Crafton to Cottonwood Row, it becomes clear that if the people of the Upper Settlement refrained from taking water from the ditch before 3 p.m., there would be enough running in the ditch below to supply the Lower Settlement till "bedtime". The water turned into the ditch at 9 p.m. would refill the empty channel by the time the

Lower Settlement farmers were up next morning and their cattle wanted a drink. It would reach the Barton ranch on the hill at 4 a.m. Thus all had daylight for their irrigating. The plan was entirely equitable.

Sometime during the years 1861-1864, while all parties were working under the agreement, an important feature was added. It was a verbal provision that users of Mill Creek water in the Upper Settlement should be responsible for the upkeep of the zanja from its intake to below the Willis lands, while the irrigators of the Lower Settlement should look after the ditch below Willis. Under this arrangement the people of Old San Bernardino would have no concern over the upper portion of the zanja unless the full stream failed to reach them when due, or an extraordinary flood such as sometimes came shut off, all water from them.

Crafton became an important agricultural center-a definite rival of Old San Bernardino in production. George H. Crafts, Sr., who had bought land there in 1858 for his brother Myron, had set it out to crops of various sorts and had turned everything over to Myron when he arrived, in 1861. Myron was an exceptionally intelligent and energetic man, but his need for additional water for his many projects in the days that came led him into moves that the courts did not always support, as will be seen.

The litigation over Mill Creek water that water-master Van Leuven foresaw in 1859 finally came; on September 21, 1864, a suit brought by Dr. Barton and other landholders in Old San Bernardino against Crafts and Willis began in the District Court presided over by Judge Pablo de la Guerra. The objectives sought were a judicial decision that Crafts and Willis had no right to Mill Creek water and an injunction to restrain them from using it. Carpenter was not made a defendant in this suit.

The claims of the plaintiffs, absurd to present-day students of zanja history, seem to have arisen from an ignorance of its age and origin. Their claim to an exclusive right to all water in Mill Creek hinged upon an alleged agreement made with Lyman and Rich in March, 1856, in which these men were to unite with the settlers in Old San Bernardino to construct a ditch in which Mill Creek water would be diverted from its natural course to irrigate lands then under cultivation by said settlers. Lyman and Rich were to give a right of way across the rancho for the ditch, and aid in its construction from a point where it left the mountains, a distance of about ten miles.

The plaintiffs alleged further that it was distinctly agreed that the parties constructing this ditch would be entitled to all waters that might flow therein, for use and for purposes of irrigation of lands owned or possessed by them on the rancho, in proportion to the labor and expense contributed. They claimed also that the defendants had occupied the lands in the Upper Settlement subject to a "servitude", or easement; and that said defendants had repeatedly made application to the Water Commission for distribution from the zanja, only to be refused, on

the ground of their having no right to it.

Crafts and Willis denied that there had ever been an agreement

with Lyman and Rich regarding construction of a ditch to carry Mill Creek water, and claimed "adverse possession" and use for irrigation of such water through having used it openly for more than five years to irrigate extensive vineyards and orchards they had planted and brought into bearing, and grain fields they had cultivated. They claimed that there was plenty of water in Mill Creek for both defendants and plaintiffs, and the reference in preceding pages herein to a wasteway to carry off excess flows shows this claim to be a fact, They claimed also that during the six years past, plaintiffs had never expended any labor or cash in repairing or cleaning out the ditch or preserving the uninterrupted flow above defendants' land, and that the defendants and other persons living on the stream did such work.

The decision, a "Consent Decree", was rendered immediately, and Judge de la Guerra enjoined Crafts and Willis from using zanja water but not entirely, as had been sought. He ruled that they must not use the water outside the hours of 3 p.m. to 9 p.m., in this clearly implying that Crafts and Willis had some rights to zanja water, though he was.not defining them. The decision was a judicial recognition of the so-called "Carpenter ranch agreement" of 1861, which had been accepted, in practice, by all concerned.

In accordance with this decision, the Water Commission of 1867, of which Dr. Barton was a member, issued an order awarding M. H. Crafts "all of the water of the said zanja every six days [sixth day?] from three o'clock p.m. till nine o'clock p.m. This was the first recognition by the Commission of Mr. Craft's right to use any zanja water.

The statement of the plantiffs connecting Lyman and Rich with an agreement concerning a ditch to carry water from Mill Creek seems meaningless to us today, in the light of what we now know. The zanja had been dug and in use f or more than forty years, then. The new waterway to which Lyman and Rich were said to have agreed must have been the ditch from the Santa Ana River, not Mill Creekthe ditch which Bishop Tenney's workers dug in 1856. Plans for this had been discussed in March of that year, as described in preceding pages. The men bringing the suit were confused regarding the two waterways, and the agreement they claimed would have been an ignoring of the functions of the Water Commission. In preparing the complaint, their attorney, a Los Angeles man clearly none too well acquainted with the situation or the history of the region, apparently attempted to make the basis of their claim come within the regular Water Commission procedure.

More lawsuits affecting rights in the zanja water followed. The next two were between claimants to water in the Upper Settlement itself. During the time that Carpenter, Crafts, and Willis had been the only irrigators there, matters had been harmonious. The fact that there was an abundance of water for all made a time schedule unnecessary for them. Willis stated that he suffered only slight inconvenience if Crafts and Carpenter happened to use water on the same day and left him too small a stream. In the next day or so all he would want would be available. He simply waited. It was the same with each of the other

men. But when Carpenter sold his land and it was subdivided, conflicts developed.

In a, suit, Crafts vs. David McCoy et al., brought by Crafts to secure judicial definition of his right in the zanja, Judge Morrison, of the District Court, decided on June 23, 1870 that Crafts was "entitled to the uninterrupted use of 3/8 of all water running in the zanja ... each and every day of the week for four consecutive hours, commeneing at 4 p.m. and ending at 8 p.m. of each day." The decree instructed the Board of Water Commissioners to see that the decree was enforced.

Acting on this court ruling, the Commissioners ordered Crafts to construct a flume on the upper side of his farm that would automatically separate 3/8 of the zanja flow from the remainder of the stream, and to take all of his water during the hours allotted to him from this measuring device. Crafts refused to obey the order. Owners of the Carpenter ranch then brought suit, Wolf et al. vs. Crafts, complaining ". . . that plaintiff persists in using the water without any gates or measures whereby he can ascertain the amount of water used by him from said Creek . . . . .

In reply, Crafts averred:

". . . that the requirements of said Board of Water Commissioners, if complied with, will compel his disuse of the water of said acequia at his said gates and outlets, and will preclude his using it in convenient quantities and at convenient points and distances, and will oblige him, in order to irrigate his farm, to take his said 3/8 of the water at one place and in one body at or near the upper part of his said farm, and will necessitate him to construct a ditch along the acequia the whole distance of his farm, and to build many flumes or sluices at proper intervals so as to cross and recross over said acequia his water to his land on either side of the same, as the needs of irrigation may require, and that said acequia, though upon and running through his land, in that event would be ofno use or subservience to him after taking from it his 3/8 of water as required by said Board.... Wherefore defendant says that the said Board of Water Commissioners, in making said order, acted illegally, exceeding their jurisdiction, and have seriously violated his rights in the premises. . . .".

After hearing the case, Judge Morrison, on June 19, 1871, modified his former decree and ruled that:

"Myron H. Crafts shall have, use, and enjoy the entire water of Mill Creek Zanja, to be used as he thinks proper for the purposes of irrigation, portions of two days each and every week, commencing at the hours of 3,p.m. and ending at 9 p.m. of said days, which days shall be regulated by the Board of Water Commissioners of this county; and it is further ordered ... that said Myron H. Crafts be, and he Is hereby perpetually enjoined from using the water of Mill Creek before the hour of 3 p.m. and after the hour of 9 p.m. for the purpose of irrigating on the days to to set apart for him by the Board of Water Commissioners. . . .".

The Board of Water Commissioners named Tuesdays and Fridays as the days on which Crafts should use the water.

The most notable of the suits involving.Mill Creek Zanja water, that. of Cave et al vs. Crafts et al., came to trial in the District Court December 28, 1875, and after completion there, some time in 18,76, was carried to the State Supreme Court. It is of especial interest to students of zanja history because the transcripts of testimony in it are available. Mr. Crafts had long been obsessed by the idea that the zanja was a natural stream in which he had riparian rights. After buying the two 160-acre farms east of Crafton known as the See and Cris-

well places, through both of which the zanja ran, and also one-sixth of the Carpenter ranch, he had notified the Water Commission of his claim to one-half the water of the zanja, and had begun drawing upon it without regard to the hours-3 p.m. to 9 p.m.-that had been specified. All the other claimants to rights in the zanja rose against him, and the suit was the result. His contention was most vehement, and since the plaintiffs contended with equal vigor that the stream was an artificial one, the controversy could be settled only in the courts.

Mr. Crafts' understanding of "riparian rights" would seem to have been imperfect, for even if the zanja had been a natural stream, his claims and his actions in connection with them would have been contrary to basic riparian rights principles-namely, that an owner of land on a non-navigable stream may make such use of its waters

as does not conflict with the interests of landowners along the stream below him. For example, he may build a dam to supply water for a mill, but after passing through said mill, all the water must be returned to the stream. It would seem, therefore, that irrigation under riparian rights had to be done with the consent of all landowners along the stream that was being utilized.

The suit was instituted at the end of a season of extreme dryness, and testimony in it, shows how the farmers had suffered. Unauthorized diversions of water had been frequent, and disputes that resulted had sometimes led to physical encounters. The main witness for the plaintiffs, in point of early knowledge, was the Francisco Alvarado mentioned earlier in these pages as having known the zanja as far back as 1826, when as a lad he had lived on the Mission Rancho San Bernardino, and later as a man had had a part in the Lugo colonizing undertaking of 1838-1841 and had used zanja water in his farming around the old mission storehouse. He was, in fact, the key witness in the suit. But for him, the case might have ended quite differently. Mr. Crafts had as witnesses on his side some of the most intelligent men in the county, and he had built up a strong case. But Alvarado's simple, straightforward testimony was incontrovertible. Mr. Crafts was defeated in both the District and the Supreme Court, and restricted to what had been allotted to him by Judge Morrison in 1871.

The decision in the Supreme Court, rendered in July, 1878, confirmed Judge McNealy's ruling of two years before in the District Court that the zanja was not a natural channel of Mill Creek, a ruling that destroyed any claim to riparian rights in the stream. Judge McNealy defined so clearly the rights of the different persons concerned that very little further litigation over rights to zanja water has ever arisen, further disputes being mainly in connection with variou* aspects of the rights of the zanja and more especially regarding Mill Creek. One dispute was the case of the Leffingwell ranch-a case, Byrne vs. Crafts et al., tried before Judge J. A. Gibson in 1886 in the San Bernardino Superior Court. It arose out of a portion of Judge McNealy's decision ten years before in the Cave vs. Crafts case. He had ruled that Ira Leffingwell and Matthew Byrne, then owners of the former Willis tract, were the owners of the waste water of the Carpenter ranch, and were entitled to use it in irrigating their land. In another part of the McNealy findings, in defining this waste water,

the Judge had used the expression, "That portion of the said waters which is not necessary to irrigate the Carpenter ranch, and which is known as the waste water of the Carpenter ranch. . . .".

Unfortunately, no court had ever decided how much water was needed for this irrigation, and the McNealy definition of the waste water was generally ignored by owners of Carpenter ranch lands. Mr. Byrne had succeeded Leffingwell to sole ownership of the property, and had brought suit for recognition, in effect, of waste water from the Carpenter ranch as defined by Judge McNealy. He claimed that water was being used on land other than Carpenter ranch land, when its owners were entitled merely to such water as was necessary to irrigate that ranch.

Judge Gibson ruled, in 1886, that "said waste water consists entirely of such water, if any, as may be allowed by the owners of said Carpenter ranch to flow past their said land, when entitled to use the same, and which said owners may not care to use f or any purpose thereupon". Appeal was taken to the Supreme Court, since this Gibson decision did not conform to the McNealy definition of this particular waste water.

The Supreme Court reversed the decision of the lower court, and ordered a new trial. John L. Campbell, Judge of the Superior Court in San Bernardino County, decreed, March 28, 1890, "that the plaintiff [Matthew Byrne] is the owner and entitled to the use of and enjoyment of all the water of said Mill Creek flowing therein between the hours of three and nine o'clock p.m. of each day, Tuesdays and Fridays excepted, in excess of 600 inches measured under a four-inch pressure. . . .".

By the close of the 1870's, what is possibly the most interesting period in the history of the zanja may be said to end. During these first sixty years of its existence it had played a part in three stages of development in the Valley-that of the primitive, Spanish-controlled mission for instruction of the Indians of the region; of the almost equally primitive Mexican-Californian stock ranchos; and of the less primitive but still sternly pioneer American occupation. The use of the zanja water in each of those periods was most wasteful. The ditch was a crude open waterway in danger of destruction in any severe rainstorm, and with no provision against losses by seepage and evaporation. The water was unused almost a quarter of the time at least, night irrigation not then having come into vogue. The decision in the Cave vs. Crafts case cleared the way for improvements in the ditch itself to prevent loss of water, and also for certain changes in distribution methods that would lead to greater efficiency and convenience.

The 1880's saw a change from the use of zanja water which primarily had been for flooding grain fields to that of irrigating orchards. However, the practice that had developed in the Crafton Settlement, that of taking water from 3 to 9 o'clock p.m. on certain specified days, was not adapted to orchard trees, as they required longer runs. It was especially inconvenient for Mr. Crafts, as his two short runs came several days apart. In 1882, wishing to develop a better system, he was instrumental in organizing the Crafton Land

and Water Company and constructing a reservoir above the Crafton subdivision. This was the origin of the "Crafton Reservoir" of today. Mr. Crafts was able to turn his two short runs into it, thereby enabling himself to utilize the water when he wished.

Attention of landowners dependent upon zanja water was turning to plans for stopping loss of water through seepage and evaporation, not only from the broad and shallow channels through which the Mill Creek water ran from the mouth of the canyon to the zanja head, but also in the zanja itself, the banks of which were lined by heavy growths of alder, sycamore, cottonwood, and other water-consuming trees. A paved stone ditch, designed to carry the summer flow from the mouth of Mill Creek Canyon to the zanja intake, was begun in 1885, owners of zanja water having purchased 320 acres of land along the line the ditch would follow. A storm destroyed a large part of the ditch, hence water was carried in it during only part of the summer, in 1886. The grade here was very steep and it became clear that costly washouts would be frequent, so the ditch was eventually abandoned. A section of it, however, is in 1950, still intact below the Edison powerhouses No. 2-No. 3 now located at the mouth of the Canyon.

In 1886 the Crafton Water Company was organized. Owners of zanja water in the upper settlement transferred their rights in the zanja flow to the Crafton Water Company at the rate of one hour of zanja flow every ten days for seventeen shares of Crafton Water Company stock. The company purchased the small reservoir 'started by Mr. Crafts and enlarged it to a capacity of 68 acre-feet up to the spillway. Also the company paved limited sections of the ditch from the intake to the point where water from it was diverted to the reservoir. At its 'formation, in 1886, the Crafton Water Company owned about 14 per cent of the total zanja flow; by 1949 its ownership had been increased to about 53per cent.

, The Bear Valley Land and Water Company had been formed in 1883 to further develop lands in the San Bernardino Valley. The promoters of this Company thought that, by impounding the water of Bear Creek in the proposed Bear Valley Reservoir (also now known as Big Bear Lake) behind a dam to be built in Bear Valley, enough water would be made available to supply not only the needs of much of the eastern San Bernardino Valley area but also the Moreno Valley.

One of the proposed features of the Bear Valley project was a line to divert part of the water from the Santa Ana River at a point about two miles abovd the mouth of Santa Ana Canyon. This part of the Santa Ana River water, including water released from the Bear Valley reservoir, would then be carried by a series of flumes and tunnels through the hills. The line would pass through.the area now known as The Greenspot and would come to and cross Mill Creek at a point about one-fourth of a mile below the zanja intake. From the zanja crossing the pipeline was to follow southwesterly along the Crafton hills and cross over into the lower end of the Yucaipa Valley and then cross San Timoteo Canyon and tunnel through the hills, thence to the projected town of Allessandro in Moreno Valley.

The part of this proposed Bear Valley line to Moreno Valley which was constructed first was that section from the zanja crossing to Moreno Valley. The Bear Valley Land and Water Company made a deal whereby the company could divert water from the zanja; then the company would return an equal amount of water to the zanja at the place where the Redlands Canal of the Bear Valley project crossed the zanja near the present Crafton School on Wabash Avenue. This meant that the Bear Valley Company would be taking water out of the ~anja at a high elevation (about 2250 feet above sea level) and paying it back at a lower elevation (about 1600 feet above sea level).

After about two years the lower zania users, upon the advice of their attorneys, protested this exchange of water. Consequently, in 1892, the Bear Valley Irrigation Company, successor to the Bear Valley Land and Water Company, was f orced to construct the portion of its line between the Santa Ana River and Mill Creek. This eight-mile link, which was known as the Santa Ana Canal when built, and now is known as the Green4pot or Bear Valley "Highline", was across very rugged terrain necessitating several long tunnels and inverted siphons which, cost nearly a quarter of a million dollars. This heavy expense in addition to others, placed the Bear Valley Irrigation Company in serious financial difficulties. The company went into bankruptcy in 1895 and after April, 1899, no water was run through the part of the Highline between the Santa Ana River and the Mill Creek Zanja. The Highline was put back into service, in 1910, by the Crafton Heights Pipeline Company and the Bear Valley Mutual Water Company. The latter company had become the successor of the Bear Valley Irrigation Company.

In May, 1893, the lower zanja users, in order to definitely prevent the Bear Valley Land and Water Company or the Bear Valley Irrigation Company from interfering with or diverting Mill Creek water, filed a complaint protesting any exchange of water (Superior Court No. 4938). The case never came to trial, evidently because the Bear Valley officials realized the company had no right to effect an exchange of water except with the consent of all parties concerned. The structures which had been built on the zanja at the Highline crossing and at the Redlands Canal crossing to effect this exchange are still in existence.

After the Bear Valley Irrigation Company had gone into bankruptcy in 1895 and the receiver had taken over the operation of the Bear Valley system, the Moreno interests had to rent water from zanja owners, usually on an annual basis. During the dry years from 1898 to 1904, several of the lower zanja users put down wells and pumped water for their own use while they rented their zanja water to Moreno or Crafton users.

With the 1880's had come another change. Railroads had entered the Valley,, what was to become the City of Redlands arose on the zanja banks, and modern life was under way. But the zanja had still maintained its,importance.

With the growth of Redlands during the last half of the 1880's came the subdivision of the 1200-acre Barton ranch into small tracts for orchards and other field improvements. This ranch included most of the land between

Colton Avenue on the north, Barton Avenue on the south, Texas Street on the east and California Street on the west. There was a considerable amount of uncultivated land put under irrigation by the sale of this subdivision, thus increasing the demand for zanja water. The Barton ranch owned 3 days out of every ten.

The remaining seven days out of ten were owned by the Old San Bernardino ranchers whose property lay between California Street on the east, Mountain View Avenue on the West, Colton Avenue on the north and San Timoteo Creek on the south. This allotment of water was quite satisfactory throughout the 1890's and until the purchase many years later (in 1926) of much of the zanja flow by the City of Redlands.

While zanja owners were occupied with their ditch from the canyon mouth to the zanja intake in 1885 and 1886 as previously mentioned, a group of business men conceived the idea of bringing electric light and power into Redlands by developing hydro-electric power from Mill Creek water, laying a pipeline, or penstock, for the purpose from the canyon mouth to a proposed powerhouse to be located near the zanja head. By 1892, Messrs. Sinclair, Fisher, and others had organized the Redlands Electric Light and Power Company (now the Southern California Edison Company), entering into an arrangement with the owners of zanja water rights allowing the power company to construct a pipeline and use the waters of Mill Creek for the generation of electric power and allowing the zanja owners to use the company's pipeline. This may have been another reason, possibly the main reason, why the ditch that had previously been started was never completed.

The power company proceeded to build a plant, called Power House No. 1, and lay 7,250 feet of pipeline with a capacity of 2,000 miners inches, the intake of the line being at the mouth of the canyon and the power plant about one-quarter of a mile above the zanja intake.

Although the story of the development of hydro-electric power in this area is interesting, it has been told fully in other publications. However, in passing, it may well be said here that Mill Creek Power House No. 1 is of more than ordinary historical interest, being a pioneer in its own right, for it was the first power house ever built which used three-phase generation and transmission of electric power.

From the water-users' viewpoint it was obvious that, by enclosing the flow of Mill Creek within the power company's. pipeline, a large loss in the stream flow due to seepage and evaporation was prevented, and thus was clearly to the advantage of the zanja owners.

However, the advent of hydro-electric power generation brought another problem to the zanja owners, this time in the form of- a suit brought by the Mentone Irrigation Company. This company, organized in 1887, was the owner of a tunnel and a system of cuts and ditches together with two springs about 3,800 feet below the zanja intake, from which the company tapped the underground water in the Mill Creek channel. The tunnel had been started in 1885, and by 1886

had been extended a distance of 1,300 feet eastward. Before 1893 the flow from the tunnel varied from 30 to 125 inches. However, in 1899 and 1900 the Mentone Irrigation Company drilled a well about 1,000 feet south of the tunnel; when the well was pumped there was no water at all in the tunnel.

The Mentone Irrigation Company sued the Redlands Electric Light and Power Company and the zanja owners, claiming that by con-fining the Mill Creek water to an impervious pipeline they prevented the saturation of the soil and consequent replenishment of the underground water. This case was decided in 1903, the court holding that inasmuch as the zanja owners' right to 2,500 miners inches antedated by many years the tunnel and works

of the Mentone Irrigation Company, and that inasmuch as the power company as a riparian proprietor was only exercising its right of taking the Mill Creek water from the stream and then returning the same water again undiminished in quantity or quality, the lower underground-water developers had no redress.

This case allowed the power interests to proceed in the further development of electric power on Mill Creek. Plant No. 2, a power house at the mouth of the canyon, was completed in 1898. The water for this power house was furnished by taking the water out of Mill Creek at its junction with Mountain Home stream and conveying it by flume and penstock to the turbinel. As soon as this No. 2 plant was finished another canal was built diverting Mill Creek water just below Forest Home, conveying it by another flume and penstock to No. 3 unit. The turbine and generators f or the No. 3 unit are in the same building as No. 2 unit at the mouth of the canyon.

In June, 1899, the owners of the zanja both in the Crafton and lower settlement brought action in court against the people in Mill Creek Canyon who were using water out of Mill Creek. This famous case was known as Barton Land and Water Company et al. vs. G. W. Tyler et al. The plaint iff (zanja owners) claimed that for many years they had used the flow of Mill Creek to the extent of 3,000 miners inches at all times, and that such priority of possession gave them rights over any diversions by late settlers in Mill Creek Canyon. This case was largely fought by the Southern Pacific Railroad as it, being owner of each alternate section of land in the Mill Creek watershed, was vitally concerned as to the ownership of the water. In June, 1902, the court ruled that the zanja owners had established a right to 2,500 miners inches of the flow of Mill Creek long prior to the land grant made in 1871 to the Southern Pacific Company, and as such the riparian owners along Mill Creek had no right to interfere or diminish the flow as long as there was less than 2,500 miners inches at the zanja intake.

A similar action known as Cave et al. vs. Tyler, which had been filed in 1894 and also decided by the court in 1902, stopped the owners of the land at the site of the present Dolly Varden Trout Farm on Mountain Home Creek from diverting more than two inches of water from Snow Creek cienega on Mountain Home Creek to be used on the property. The owners prior to 1902 (Skinner then later Kate Harvey) had been using up to 15 inches to irrigate apple trees and

other crops; the court held that any diminution of the flow under 2,500 miners inches at the zanja intake inflicted an injury on the zanja owners.

,Concurrently with this case, action was brought in July 1899 by the zanja owners against Mrs. L. Chamberlain. Chamberlain was the successor in interest to a Mr. Reed, who first settled on a 60-acre tract about one quarter of a mile below the zanja intake in 1871. The zanja owners, in consideration of Reed's looking after the zanja intake, allowed him to use some water. However, in 1874 they protested strenuously when he enlarged his fields and diverted more water from the zanja than what he needed for his domestic use. Mrs. Chamberlain claimed that Reed first used five inches, then in 1875 used thirty inches, and as his successor she was entitled to thirty inches of water from the zanja flow. The court ruled in August 1900, that the zanja owners were owners of 3,000 inches of Mill Creek water and that neither Mrs. Chamberlain nor any of her predecessors in interest had any right to the use of Mill Creek water.

The next quarrel affecting Mill Creek water occurred between the Crafton Water Company and the lower users. During the extremely dry years of 1898 and 1899 the surface flow of Mill Creek at the zanja intake dropped below 200 miners inches. This seriously hampered the Crafton people, so they approached the lower users with the proposition of developing the subsurface flow of Mill Creek above the mouth of the canyon. The lower owners did not feel that they could put more than $5,000 into such improvement.

The Crafton people realized that, based on ownership, their share would only be $3,000 and that the total of $8,000 would not be sufficient to defray the cost of the proposed development. Consequently, the Crafton Water Company, on its own initiative, put down a shaft in Mill Creek canyon about 1,000 feet upstream from its

debouchure onto the debris cone. This well, although 123 feet deep, pumped only 50 inches of water and was never used except during 1899.

Before the completion of this well the Crafton Water Company started another shaft about three miles farther up the canyon at the junction of Mountain Home Creek and Mill Creek near what is now Igo's store. They dug a shaft 90 feet deep, then branched into two drifts, one to the north 600 feet and the other to the south 68 feet. They pumped 140 inches from this well. The Redlands Light and Power Company furnished electric power for pumping gratis, as the water from this shaft was discharged into its canal, thus adding to the flow through its No. 1 and No. 2 generating plants.

On the advice of its engineers, Boggs and Finkle, the Crafton Water Company constructed flumes to convey the surface water from a point 1,200 feet upstream from each well to below the well; by bypassing the surface flow in this manner the Company hoped that its pumping would not affect the water in the creek. In 1906 a suit was brought by the lower zanja owners to stop the pumping of the wells in the canyon on the ground that it decreased the surface flow of Mill Creek. This case, known as Barton Land and Water Company et al. vs. Crafton Water Company, involved considerable field work. Both par-

ties took measurements to ascertain the effect of the pumping on the stream flow and a good deal of testimony was given by the principal engineers, Trask for the lower zanja owners, Finkle for the Crafton Water Company, on the hydrology of Mill Creek Canyon. It was the decision of the court, in March 1907, that the surface and subsurface waters of Mill Creek were one and the same; that the subterranean waters were not separated by any impenetrable strata; and that inasmuch as the sub-surface waters were a part and parcel of the waters of Mill Creek, they belonged to the zanja owners,'and that the Crafton Water Company had no right to develop them for its exclusive use.

Thus by 1907 the rights to Mill Creek water were fairly well established by court decisions and the owners seemed content to let things remain in a status quo. However, it was evident to all that an enormous loss took place because of the 12 miles of open unlined ditch between Crafton and the lower users. As one owner put it, "there was always plenty of money to fight lawsuits but none to improve the water supply." Better pumping machinery made it more economical for many of the lower users to secure their water from wells and sell their Mill Creek water to parties in the Crafton area. Some even sold on a month-to-month basis to users in Moreno, where the zanja water could be conveyed.

Until 1921 the only works on the part of Mill Creek down stream from the zanja intake were the tunnel and two adjacent wells belonging to the Mentone Irrigation Company as described in this volume, and also two wells connected to a short tunnel at the site of what was called German Springs, about 2,000 feet northeast of Rocky Comfort (the intersection of Mill Creek Road and Garnet Street). These two lower wells together with several hundred acres of land had belonged to the Mentone Land and Citrus Company but had passed into the hands of the mortgagor, the Great Republic Life Insurance Company, in 1921.

Mr. George Humphrey promoted a plan to further develop the underground waters on that part of the Mill Creek debris cone downstream from the zanja intake. (The Mill Creek debris cone is the rocky land which is along and on both sides of Mill Creek, consisting of boulders and coarse gravels which have been carried along by flood waters and then dropped from the stream when the flood waters spread out after leaving the narrow canyon.) He secured an option on approximately 1100 acres of land and asked the court to adjudicate the amount of water to which the owners of the existing works were entitled. The court decreed that the Mentone Irrigation Company and others who had entered into these works were entitled to a perpetual flow of 121 miners inches from their tunnel and well developments and any other further developments which might be made on that land. Sixty min-

ers inches were to be delivered to the owners to the north of Mill Creek in the Greenspot area and the remaining 61 inches to the owners in the Mentone area. Mr. Humphrey acquired title-to the land, subject to the adjudicated rights, and promoted the formation of a mutual water company to further extend the tunnel and increase.the supply of water.

The East Lugonia Mutual Water Company was incorporated in

1921 and bought a three-quarter interest in the approximately 1100 acres. The City of Redlands had also become interested in the project. However, the law at that time precluded a municipality from owning stock in a mutual water company, therefore the city acquired outright the other one-quarter interest in the Humphrey land. To secure funds with which to develop additional water, the East Lugonia Mutual Water Company floated a bond issue on its three-quarter interest in the land, borrowed $200,000 in 1923,,, on fifteen year bonds at six per cent interest. This was a lien, subject to the 121-inch right, on all future improvements. The land in question consisted of about 1100 acres in the Mill Creek wash extending down stream from the Edison Power House No. 1 to Crafton Avenue and lying north of Mentone Boulevard. When the money was borrowed on the bonds the City of Redlands agreed to pay one-fourth of the interest and principal on the maturing bonds. Also the City of Redlands had charge of the physical properties and the company's books were kept at the City Hall up to about 1934.

The old tunnel was reconstructed and extended some distance making it about 1800 feet long; also two wells were drilled and pumps installed on these shafts alongside the tunnel. This development produced a large supply of water when the flow of Mill Creek kept the Mill Creek debris cone filled with water, also being aided by extensive spreading along the stream bed.

The company then installed a steel 24" pipeline for a distance of two miles westerly to Mentone. The line was built to carry the water from the tunnel down the slope to a series of three additional wells spaced about one mile apart on the Mill Creek debris cone between there and Mentone. These wells were equipped with pumps driven by water turbines so that the water flowing under pressure in the steel line would furnish the power to operate the turbines, thus pumping water from each of the wells. This steel line connected with the Bear Valley Company's Canal in Mentone; also a 14" concrete line was laid west down Lugonia Avenue as far is Judson Street for delivery of water to East Lugonia stockholders. However, except in extremely wet years there was not enough water to supply the 121 inches prior right and also to run the turbines so the turbines were replaced by electric motors.

During the first years of operation there was frequently in excess of 300 miners-inches of water available from the development and in the first six years $60,000 had been paid toward the principal as the first maturing bonds became due. However, the drought years had resulted in small flows in Mill Creek and as a result there was very little water available for spreading. Consequently, the flow from the tunnel rapidly diminished and was not even sufficient to supply the 121 inches of prior-right. Because of this lack of water and because of the economic depression which was occuring also, and because of increased costs of operation it became impossible to assess the stockholders to the extent necessary to keep up payments of the interest and principal on the bonds; hence payments were defaulted by both

the East Lugonia Mutual Water Company and by the City of Redlands, which had also agreed to make payments on the bond issue. Therefore, the bondholders formed a protective committee. The bondholders' committee met with the company at intervals over a period of several years but was unable to reach an agreement. Bondhold-

ers refused to accept more than one offer from the stockholders to go on temporarily at a reduced rate of interest and reduced annual payments on the bond, and sued the stockholders for personal liability. The Court decided against the bondholders on this and for several years desultory attempts to make a settlement failed.

The City at this point indicated that they did not feel like going along pro rata with the stockholders in the financing of the project. However, after long negotiations between the City and the bondholders, the City agreed in 1941 to take over most of the property and to assume the payment of 50% of the face value of the $140,000 of unpaid bonds and to pay off this $70,000 over a period of ten years at 3% interest. In this settlement the stockholders of the East Lugonia Mutual Water Company received the well in Mentone, the distributing line down Lugonia Avenue and the five acres of land near Crafton Avenue above Mentone for a well site. Since then they have continued to operate the company free of encumbrance.

The City of Redlands has made annual payments against the bonds and in the fall of 1951 made the final payment and exercised the option on the land. As a result the City of Redlands now owns the properties, subject to the 121-inch prior right.

In 1925 ten hours of the zanja flow were purchased by the Moreno interests. These hours were exchanged for Crafton Water Company stock, so that in actual operation the users in Moreno receive Bear Valley water which is due the Crafton Water Company on its stock ownership in the Bear Valley Mutual Water Company. In 1929, the Santa Ana River Development Company, an Orange County organization, filed suit and a stipulation was entered into governing the amount of Mill Creek or other water from the San Bernardino Valley which can be exported to Moreno. This stipulation limits the quantity to 2,131 acre feet per annum.

Additional power-generation developments for Mill Creek had entered the picture for a time. Simultaneously with the devMopment which the Redlands Electric Light and Power Company had made with its No. 2 and No. 3 plants between the mouth of the canyon and Forest Home, a Mr. Baldwin of Claremont filed on the power rights to Mill Creek above Forest Home. In 1915 Mr. Van Zandt had made a survey and plans for the diversion of High Creek, Vivian and Falls Creeks. In 1920 the Southern Sierras Power Company, now the California Electric Power Company, became interested in the project. The Company secured State and Federal Power Commission permits to proceed with the development and started work on a hydroelectric generating plant at Forest Home. It was planned that, this plant would operate under 2,063 feet of head and secure water from the above-

mentioned tributaries of Mill Creek. After intermittent work and extension of development time the project was finally abandoned in 1931 due to the over-all cost of generating power there as compared with other means, especially considering the smaller amount of water, available that far upstream, and because of improved transmission techniques which made it more economical to secure Hoover Dam power rather than proceed with this project.

The court decisionof March, 1907,in the Barton Land and Water Company et al. vs. Crafton Water Company regarding the subsurface flow of Mill Creek had effectively stopped all development work in Mill Creek above the zanja intake for a time. However, in 1927 the zanja owners, through an organization known as the Mill Creek Owners, installed a pump on the old well by Igo's and then proceeded to drill another well about two miles farther up Mill Creek Canyon. The expense of this organization was borne by all the zanja owners. A fourth well was put down in 1929 approximately one mile above the mouth of Mill Creek Canyon. This well was equipped with a submersible motorpump and was completely buried in the March, 1938 flood.

Wells No. 2 and No. 4 have been pumped every year since 1927 with the exception of 1938, in which year there was sufficient gravity water to maintain normal delivery. A fifth well was dug in 1948 about a mile upstream from well No. 4. In a dry summer such as 1950 these three pumped wells together produce approximately 250 miners inches. During the past 25 years (before 1950) the Mill Creek Owners have purchased several large tracts of land in Mill Creek Canyon and spent over $100,000 in pipelines and development work.

Other changes, most of which are now matters of common knowledge, have occurred over the years. In times of heavy rains in the mountains,, the zanja sometimes menaced the city, and steps were taken to control it-diverting it at certain points, and turning additional stretches into storm drains. In speaking of this, one writer says: "Before the settlement of the city, this water ran in irregular gulches; now it is carried in paved and walled channels, and the zanja itself through the business portion of the city has been treated in the same way. The principal streets are so bridged over it, however, that a stranger would hardly recognize the existence of such a stream. Had he been here in the early days of the town, he would have seen streets flooded, cellars filled, and damage done in the occasional violent summer storms that visit the locality."

A new development of major importance came into the picture when, in 1926, the City of Redlands bought into the zanja. By this time the entire flow of the zanja, except the part between the zanja intake and the headgate of the canal to the Crafton Reservoir and the stretch through the Davis property on Brookside Avenue, was being carried in pipelines or in stone ditches. So long as Mrs. Jennie Davis and her daughter retained ownership of the Brookside Avenue property, the zanja waters flowed openly through it, a stream of great beauty.

After buying into the zanja water rights, Redlands City sank two wells on Texas Street near its intersection with the zanja in the west part of town, with the idea of conveying the well water to holders of zanja rights in West Redlands and the so-called Lower Settlement beyond, thereby doing away with the necessity of carrying zanja water from above the city. Pipe was laid from the wells along the line of the old zanja to the west, so that water could be delivered in it directly to persons entitled to it.

A $525,000 bond issue was voted by the people of Redlands in the spring of 1926 for the purpose of buying these rights to Mill Creek water. The City then approached the owners of Mill Creek water below Redlands with two alternatives.

The alternative known as option "B" provided for these owners to sell their water to the City of Redlands for $5,000 an hour (1/240th of the perpetual flow of the zanja) ; then the City would guarantee to supply them with pumped water at cost and whenever the remaining users were not taking the full 2,500 inches they could have Mill Creek water at ten cents per day-inch. The area within which this water could be used was outlined; it included, generally speaking, all the area between Colton and Barton Avenues to the east of Mountain View Avenue as far as California Street, then the area between Citrus Avenue and Barton Avenue east to Tennessee Street, then a small irregular block adjacent to the zanja east to Texas Street. This option only applied to property within this specified district whose owner or his assigns had rights to zanja water. Up to 1937 the City furnished water to any property within this specified district at the same cost. This has now been changed so that those without a contract are ?aying the current irrigation rate for city water of 69 cents per dayinch while others under the "B" contracts pay about 30 cents.

The other alternative, known as option "A", was simply a contract providing that the city would perpetually deliver water to zanja owners but would allow the city to abandon the open ditch and use pipelines instead. Although none of the zanja owners signed this option "A" the City proceeded to replace the zanja with a pipeline and to date (1950) no dispute has been raised because of this act.

The City of Redlands took out its portion of zanja water at a point immediately below the discharge from the Edison Company's Power House No. 1 on Mill Creek one-quarter of a mile above the zanja intake. The water was taken thence through a.coagulating and settling tank to an equalizing reservoir near a filtration plant from which the water was carried in steel pressure lines to the several city reservoirs. This system gave the Redlands city water department a very economical and satisfactory auxiliary water supply. The Mill Creek surface water is much softer than the deep well-water from the pumped wells of the City of Redlands, and thus the mixture improved the total supply.

The fact that the Redlands water department took such a large proportion of the zanja flow from the users west of Redlands made it impractical for the small number of remaining users to continue to take their quota of water through the open zanja ditch; these owners agreed with the City of Redlands to take an equal amount of water at their several points of delivery on approximately a cost basis from the Texas Street wells. The city agreed informally to turn water into the zanja occasionally to keep the trees alive along its banks.

Purchase of the major portion of the lower zanja rights by the City of Redlands and abandonment of the open ditch involved the city in a conflict with several of the upper users. With the construction of the Crafton Water Company's reservoir in 1886 the largest portion of the water belonging to the upper users had been diverted into the reservoir at a point approximately one mile below the zanja intake. However, Mr. Paine and several others, as owners of the old Carpenter ranch, had continued to operate their diversion gates at 3 o'clock p.m. on the dot, thus appropriating all the water in the zanja between the Crafton reservoir headgate and their diversion gate, a distance of more than a mile.'

During the dry years beginning in 1898 the Crafton Water Company had adopted the practice of closing its main gate on the zanja sometime before 3 o'clock on the supposition that when the owners of zanja hours had exchanged their time for Crafton Water Company stock they had no more rights in the zanja as individuals. Suit had been brought by these individuals, Craig et al. vs. Crafton Water Company, to establish their right to the water existing in the zanja between the Crafton headgate and the old Carpenter ranch diversion gate. The court had granted them the right to this water. Consequently in 1926 when the City of Redlands proposed to divert through its filter plant all the zanja water which had been going to the lower settlement users, it would have meant there would be no water to supply this right.

A further complication arose because of the fact that when Mr. Crafts in 1885 had deeded his zanja hours to the Crafton Land and Water Company he had retained the right to all flow over and above 600 inches. In 1912, certain of his heirs had started a suit to establish just how much this so-called "overplus" of water amounted to, but the case was never tried. In 1926, Mr. Junius Pierce, as owner of the Crafts home place, was heir to this indefinite right. Besides this right to overplus water, the Crafts for many years had bypassed a small stream of water out of the zanja and through their garden. This so-called "knothole" right would also be stopped if the City of Redlands diverted the water above. The value of these rights was of difficult appraisal.

A citizens committee composed of Thomas Sanborn, George Humphrey and H. H. Garstin was appointed to compromise these rights. They evaluated the Carpenter ranch right, which by 1926 was entirely owned by Mr. C. T. Paine, as equal to 20 minutes of water each day, or in the ten-day period equal to three and one-half hours of zanja flow. Mr. Paine was paid accordingly for the water at $5,000 per hour. To Mr. Pierce they allotted 300 day-inches of water each month to be used exclusively on the 17.9 acres adjacent to the diversion point on the southeast corner of Colton and Crafton Avenues.

With the purchase by the City of Redlands of a large portion of the Mill Creek water rights which had been owned by lower settle-

ment users, it meant the moving of the place of use of practically all the Mill Creek water to land of higher elevation.

There is still about eight per cent of the total flow of Mill Creek in private ownership, but this water will probably never again be delivered through the old Indian-made zanja.

It is interesting to follow the ownership of the zanja hours throughout the years. Tradition has it that the Mormon elders, Messrs. Lyman and Rich, allotted the time in the Mill Creek zanja to the first Mormon settlers in proportion to the size of each family. The first known record of ownership was listed as an exhibit in one of the early trials and was f or the year 1859, as shown below. Evidently at that time the water was rotated every eight days; however, by the year 1867 this had changed to a ten-day schedule.

The ownership as given in the Water Commissioners' minutes for February 2, 1867, is also shown below, and for comparison the ownership as of November, 1949, is shown.

OWNERSHIP OF MILL CREEK ZANJA

1859

OWNER Hours

UPPER SETTLEMENT:

Carpenter Ranch 34.33

LOWER SETTLEMENT:

Ben Barton 30.22

Oliver Childers 13.12

James White 16.47

Alfred Bybee 31.85

Joseph Wilson 8.24

Bushrod Wilson 2.75

John Van Leuven 8.23

Louise Van Leuven 8.23

B. Van Leuven 16.47

Anson Van Leuven 21.95

Unassigned .14

192 hours or 8 days

1867

OWNER Hours

UPPER SETTLEMENT:

Carpenter Ranch 60

LOWER SETTLEMENT:

Ben Barton 36

W. Curtis 17

Tuttle & Pishon 17

Frink 18

Joseph Wilson 13

B. W. Wilson 12

St. Clair 5

J. Cole 13

L. Van Leuven 13

B. Van Leuven 18

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240 hours or 10 days

OWNERSHIP OF MILL CREEK ZANJA 1949

OWNER	HRS.	MINS.	ASSIGNED TO, for use this year
UPPER USERS:			
Crafton Water Co.	127	31	
City of Redlands	93	39	
G. W. Curtis	4	0	Redlands Heights Water Co.
Lee Hill	1	0	Bear Valley Mutual Water Co.
W. Seavey	1	9	Bear Valley Mutual Water Co.
E. Highland Orange Co.	2	30	
Frank Cole	2	0	East Highland Orange Co.
Lloyd Yount & Old Town Rancho	2	30	East Highland Orange Co.
H. W. Cole	1	0	East Highland Orange Co.
Mrs. Harry Porch	1	15	East Highland Orange Co.
Morse		45	East Highland Orange Co.
USERS IN LOWER SETTLEMENT:			
Joe Prendergast	30		
Dr. Neff	30		
Theodore Curtis	1	0	
C. S. Mitchell		26.25	
Pinto		3.75	
M. M. Soares	15		
Herring		10	

240 hrs. 5 mins.

Speaking in technical terms, the entire flow of Mill Creek waters, so far as owners are concerned, represents 240 hours. Of these it will be seen that the Crafton Water Company owns 127 hours and 31 minutes or about 53 per cent; the City of Redlands owns 93 hours and 49 minutes which is about 39 per cent and about a dozen individual owners, or growers, own the remainder or 18 hours and 50 minutes or 8 per cent. Although these latter individuals own rights to this amount, the city controls it, since it is delivering water from city wells to them. in place of zanja water, as already described. Therefore, it can be said that the Mill Creek waters are now almost entirely controlled by two organizations-the Crafton Water Company and the City of Redlands.

Of the fine old trees that bordered the original zanja, a few have been kept alive by water occasionally turned into the old channel by the City of Redlands as agreed to by them and by occasional waste water from adjoining properties. Today, a cautious driver can take his car much of the way along the course of this one-hundred-six-tyyear-old stream, and picture to himself the thing of beauty it must once have been as it splashed peacefully along down its winding channel toward the old Mission outpost - this, the zanja or ditch which since that time has been one of the most litigated streams in this whole region.

Eventually the zanja will probably disappear from the irrigation system in the same manner as the horse and buggy has disappeared

f rom. the highways. The old zanja will then probably remain only to function as a storm drain, its days of rippling serenity fading into the past. However, the water which it was built to carry will continue to be part of the lifeblood of this area.

Perhaps the most recent litigation involving Mill Creek was in regard to the spreading on the Mill Creek debris cone of water during the winter months which was not being used by the zanja owners, this spreading being done to replenish the ground-waters. In 1932 the Irvine Company filed suit against all parties engaged in spreading water on the Santa Ana, Mill Creek and Lytle Creek debris cones in San Bernardino County. The Irvine Company was later joined by the Orange County Water District on behalf of many of the water users in Orange County. This litigation was the result of apprehension on the part of agricultural interests dependent for their water supply on the Santa Ana River in Orange County. They claimed that the spreading operations in various locations named diminished the flow of water in reaching Orange County from the Santa Ana River.

A discussion of the suit is set forth in the first part of this text dealing with the Santa Ana River, therefore it need not be discussed in detail here.

Water spreading on Mill Creek had been practiced for many years prior to 1932 as there were tunnels and wells which were directly benefited by replenishment of the underground gravels with winter water. At the time of filing the suit the East Lugonia Mutual Water Company and the City of Redlands had charge of the water spreading, but in 1936 the work was taken over by the San Bernardino Valley Water Conservation District although the property remained in the names of the former parties. In 1932 the firm of Surr & Hellyer together with the Redlands City Attorney were named to represent the defendants. During the years of discussion and conferences over the Santa Ana spreading the matter of Mill Creek was kept in abeyance. In 1936 the Irvine Company engineers made a report recommending that a water committee be chosen to study the effect of Mill

Creek spreading and that during this period of study not more than 40 cubic feet per second be diverted onto the spreading grounds. This seemed altogether unnecessary and unfair to the defendants in view of the fact that they had previously diverted the entire flow up to as much as 80 cubic feet per second; consequently they would not agree to such a reduction. Matters remained in status quo although the Orange County Water District did propose a definite settlement in 1939 based on spreading of 50 cubic feet per second and the elevation of the water table in one well. This was still unsatisfactory to the defendants and its was not until 1942 when at the insistence of the court to settle that the Orange County Water District and Irvine finally withdrew their drastic demands. The judgment contained the following provisions: the flow of Mill Creek up to 65 cubic feet per second may be diverted at any and all times except during the months of January and February when, if the natural flow of Mill Creek and the power canals at the mouth of Mill Creek Canyon exceed 65 cubic feet per second, then spreading shall cease. Spreading may then be

resumed when the flow returns to 65 cubic feet per second or less. In all other months, whenever 65 cubic feet per second is available it may be diverted regardless of the size of the flow.

These provisions regarding the spreading on Mill Creek reduced the amount of maximum diversion which could be made. This maximum had been made only for a short period of time in the year 192-12 and again in 1937. From a study of the records the provisions. preventing spreading at times of floods in January and February is effective on the average of 5 days a year; usually at those times the water carries so much silt and debris as to be difficult to handle on the spreading grounds. There have been only 7 years f rom. 1918 until 1951 when the flow of Mill Creek and canals exceeded 65 cubic feet per second. Hence, f or most of the years spreading is not affected by the judgment.

Material added to that of Mr. Beattie was primarily from the files of the San Bernardino Valley Water Conservation District and from personal knowledge of the contributors of supplementary material.