THE CARROLL IRRIGATION SYSTEM

San Diego, California, Nov. 18, 1916.

Mr. W. E. Hodges,
Vice-President.

Dear Sir:-

In line with the suggestions contained in your letter of September 10th to Mr. Ed Fletcher, I have co-operated with Mr. Post in making a new survey of the proposed reservoirs and have made a careful study of the land available for irrigation and am now reporting as follows:

THE CARROLL RESERVOIR

I made no independent surveys for this reservoir, but was with Mr. Post's men both in the field and office, and am perfectly sure that the work is accurate; and that the two sheets, Exhibits "A" and "B", correctly represent the area and capacity of the two reservoirs. Also that the large contour map, Exhibit "G" (furnished by Mr. Post) correctly represents, not only the reservoir, but also the several parcels or divisions of land, which it will be necessary to appropriate for the reservoir. I assisted in working up the description of these several parcels of land, and believe them to be absolutely correct.

It is proposed to tap the reservoir with an outlet pipe on the 255 foot contour. The capacity of the reservoir below this elevation is 1,535 acre feet. This quantity would not be available for irrigation by gravity, but in case of a shortage of water, could be pumped into the pipe line and utilized.

THE SAN DIEGUITO RESERVOIR

This reservoir is located in the northeast part of the ranch property, and is shown on the map, Exhibit "F". It is also shown in sketch, on the map of the ranch, Exhibit "E", and the Geological Quadrangles, Exhibit "D". The description in the deed, to cover the property, corresponds to the high water contour, except that there is a little additional land included at the dam, to cover the slopes, wasteway and pumping plant. Total area 92.8 acres, .3 acre outside of Ranch property.

This reservoir is intended as a distributor, more than for storage. It is proposed to tap it with three outlet pipes; two of which are to be on the 235 foot contour.

The elevation of the spillway is proposed for the 250 foot contours. This is only five feet below the proposed outlet of the Carroll Reservoir, consequently, when the San Dieguito Reservoir is full, it will back the water up the feed pipe line to some extent.

THE DISTRIBUTING PIPES

Preliminary surveys have been made for the main pipe between the two reservoirs, and two lines, a booster and a gravity line, have been extended to and across the Lockwood Mesa, but no final location surveys have been made. Furthermore, it has since been found advisable to place the main pipe line at a higher elevation, therefore its location will be somewhat changed from the original survey; but the proposed new location is well defined on the maps. Also, the distributing lines are laid out on the quadrangle map, Exhibit "D", in approximate location.

As before stated, there are to be three outlet lines from the San Dieguito Reservoir.

1st. The booster line, which is intended, by pumping, to reach the lands on the San Dieguito Ranch and the Lockwood Mesa that lie above the Hydraulic grade of the gravity line. It will feed a storage reservoir on the highest part of the ranch, on the 340 foot contour. Pumps for this line will take water at an elevation of 245 feet.

2nd. The Lockwood Mesa gravity line, - The intake would be on the 235 foot contour. It would extend in a southwesterly direction along the north side of the San Dieguito watershed to a low saddle in said watershed, 1.7 miles from the beginning point, where it would divide (point "K" on the maps). From this point two lines, one on each side of the watershed, would extend to a second junction (point "J" on the map). This junction is the starting point for the Encinitas line. A third junction would be on the south Lockwood line ("L" on the map), where the Del Mar line would branch. This branch would supply lower Del Mar by gravity; while the more elevated portion and Del Mar Heights could be supplied by pumping.

The Encinitas line would extend north from "J" to "X" through the Encinitas and Merle districts and into the Lacosta district, in Section 33 where it would unite with the Green Valley line.

The 3rd line, or Green Valley line, would extend from the reservoir in a northwesterly direction, through Olivenhain and Green Valley districts to a point in Section 25, north of

the Batiquitos Lagoon, where it would turn west and join the Encinitas line at "X". The intake of this line would also be at the 235 foot level.

From "X" an auxiliary line would extend north through the Lacosta district to the south limits of the Hedionda district at the Lagoon.

The arrangement of these lines with the proper gates would have the partial effect of a dual system, and tend to prevent an entire tie up in case of a single break. In case of a break in the Lockwood line, water could be passed from the reservoir to Del Mar by way of the Green Valley and Encinitas lines.

The following tabulation shows the different lines, with their names, destination, and approximate length, pricked off from the map.

No. 1, Main Line, Carroll Dam to San Dieguito Reservoir,
Length 4.4 miles.

No. 2, Booster Line, San Dieguito Dam to Lockwood Mesa,
Length 7.0 miles.

No. 3, Lockwood - North Line, San Dieguito Dam to Junction 2-"J"
Length 7.7 miles.

No. 4, Lockwood - South Line, Junction 1-"K" to Junction 2-"J",
Length 7.7 miles.

No. 5, Del Mar Line Junction 2-"L" to Del Mar,
Length 2.0 miles.

No. 6, Encinitas line-Junction 2-"J" to Junction 4-"X",
Length 7.4 miles.

No. 7, Spring Valley Line - San Dieguito Dam to Junction 4-"X"
Length 11.2 miles.

No. 8, Hedionda line - Junction 4-"X" to end, near Hedionda marsh,
Length 3 miles.

The map indicates the different districts that each line is proposed to supply.

IRRIGATED LANDS

I have divided the lands that it is proposed to irrigate into 13 districts (See Geological map). The elevation of these lands vary from sea level to about 400 feet. The elevation of the gravity flow varies from about 160 feet to 240 feet; according to the distance from the storage. To irrigate any lands above the given elevation will require pumping. The territory is the coast lands four or five miles wide, extending from Del Mar to Carl. It is shown on the large map, Exhibit "H", prepared by Mr. Post.

The territory includes a large amount of land that is not arable. Generally this is on account of being washed and broken. There is some marsh land, but only an insignificant amount of rock land. Almost any of the land could, and would be utilized with dense population and intensive cultivation.

The formation shows a series of ridges parallel with the coast. The 3rd well defined ridge is about two miles from the ocean and attains an elevation in places of 400 feet. Further inland the land is generally lower, with more variety to the drainage. On account of this topography, two main pipe lines paralleling the coast would seem to be desirable.

This territory includes many abandoned farms, presumably the early settlers starved out. I am inclined to think, however, that in most cases, they did not leave the land from necessity, but in answer to more inviting calls from the towns. I have endeavored to make a fair and independent classification of these lands, That is, I went upon the ground, and with Mr. Post's map in my hands, viewed the different tracts

and made my best guess at what was arable and what was not arable. I am well aware that there is quite a difference of opinion as to what is or is not arable. It depends somewhat on the value of the expected products. I have taken my "Q" from what has been accomplished at Olivenhain, where dry farming only is practiced. Irrigation would offer greater inducements to reclaim the land.

The arable lands are divided into two classes; those to be irrigated by gravity and those requiring pumping. This division is made in accord with the elevations given on the Geological Quadrangles. After this division, I have made some deduction in most cases for contingencies. These contingencies consist, in part, of lands already partially supplied with water; lands that are too high or isolated to reach economically with a conduit; and lands with small washes or rocky spots. The final quantities are inserted in the net column in my tables, Exhibit "C".

The territory included in my 13 districts is the same that is covered by Mr. Post's large map, except that I have added something adjoining or near to the San Dieguito Ranch. My own judgment would dictate omitting the 2nd, 3rd and 9th districts; but am including them to make my classification comparable with Mr. Post's. I would omit the 9th district on account of distance, and for the reason that it could probably be more economically supplied from the San Luis Rey. The 2nd and 3rd districts are near at hand; but they are on the wrong side of the San Dieguito River. Del Mar is already provided with 50 inches, which, in my opinion is more than they will use there for many years to come.

The Santa Fe hill lands on the south and east of the San Dieguito valley could be irrigated by pumping from wells. I believe there is no other urgent demand for water on that side, at this time.

I would recommend holding the south side of the San Dieguito in abeyance for the future. For the time when the Carroll Dam will have to be raised, and the capacity of the reservoir increased. A conduit could then lead water from the Carroll Reservoir on the south side and reach a large body of good land on various ridges between the San Dieguito Ranch and the McGonigle canyon.

Omitting the three districts, as suggested, my classification would show the following. Land to be supplied by gravity, 14,894 acres, by pumping 7,323 acres. This, I believe, will more than furnish a market for the available water.

DESCRIPTION OF DISTRICTS

1st District - Weller - Located adjoining the San Dieguito Ranch on the north and east. Not in Mr. Post's estimate; but put in for the reason that it is along the water conduit and close to the source of supply. The acreage is small, but the land is good and mostly is, or has been in cultivation.

2nd District - Dutch Mesa - Located south and east of the San Dieguito Ranch.

To supply this district with gravity water would require a syphon line across the river near the east line of the ranch property (not shown on the map). The area is a long narrow strip of hill land bordering the ranch and the valley. It is cut in two by numerous ravines, and not very inviting for an

irrigation project. The portion requiring pumping is much the larger part.

3rd District - Del Mar - Location: Del Mar and Del Mar Heights, and extending back for a couple of miles from the coast. The land is mostly elevated in this district. The pumping area is greater than the gravity area. The greatest demand for water now, is for domestic and gardening purposes. Mr. Kellogg reports the actual consumption at Del Mar in 1912 at 9 inches. It is probably no greater today. This seems rather discouraging, but it is aside from the purpose of this report.

It is proposed to reach this district with a gravity line from the Lockwood Mesa; said line to be put in and maintained by the district.

4th District - Lower San Dieguito Valley - It includes all of the valley lands below the San Dieguito Ranch. A small portion of the land is occupied by the channel of the river and there is some marsh land. The latter could be reclaimed by dyking and lowering the water plane by pumping.

The water supply would be by gravity from the Lockwood main.

5th District - Lockwood Mesa - Consisting of the divide between the San Dieguito and the San Elijo, and west of the Santa Fe Ranch. This area, being mostly owned by Mr. Henshaw and associates has had more careful surveying than the other districts; consequently the pipe lines here shown on the Quadrangle map are from actual, though preliminary surveys. The water supply comes direct from the San Dieguito Reservoir and only 25% of it will require pumping.

6th District - Encinitas - Located between the San Elijo and the Encinitas draw, and extending inland to the breaks of the mesa overlooking Olivenhain and Green Valley. It includes two villages, Cardiff and Encinitas. Both very indifferently supplied with water. A small pumping station is located in the Encinitas draw, but the supply is limited. To supply this district a main will pass from the Lockwood line through the west portion of it, along the hydraulic grade line to the next district beyond. The area of reclaimed land requiring pumping would be 47%.

7th District - Merle - This district lies north of the last and is bounded by the Encinitas draw and the Batiquitos Lagoon with Lower Green Valley district on the east. It is situated very much the same as the last, with the water main extending through from south to north along the western third of the district. And, although the elevation in the eastern part reaches 400 feet, the slopes are smoother and the plan of irrigation would be simpler than in any of the other districts. 42% of the reclaimed area would require pumping.

8th District - Lacosta - Located between the Batiquitos and the Hedionda Lagoons, and extending inland about 4 miles. It is in this district that Mr. Henshaw and associates own 1,400 acres of excellent land in the Hedionda Grant. 39% of the arable area would require pumping, and 40% of the total area is unfit or waste.

Two pipe lines, one ~~xxx~~ by way of Green Valley and one by way of Lockwood Mesa would join in the southern part of this district; and, from the junction another line would extend north parallel with the coast to the limits of the Henshaw land.

9th District - Hedionda - Located furtherest north of any of the districts. I would omit it from consideration on account of distance. The distance from Carroll Reservoir by the shorter pipe line route, to the southern, or nearest, limits of this district, is 18.6 miles. The elevation of the hydraulic grade at this point would be about 160 feet. This somewhat increases the proportion of pumping over a similar district lying nearer the source of supply. In this case the pumping area would be 53% of the arable land.

10th District - Lower Green Valley - Located in the drainage of the Batiquitos, and north of the Encinitas Grant. Although it lies back from the coast, the pumping area is only 30% of the arable land. The district is small and lies mostly in the small valleys that converge to the Batiquitos. It would be supplied by the Green Valley pipe line, direct from the San Dieguito Reservoir.

11th District - Upper Green Valley - Located on what may be called the Green Valley mesa, and reaching down the drainage to the north west corners of the Encinitas Grant. It is largely mesa land, and the pumping area exceeds the gravity area; but the relative amount of waste land is small - 24%. It would be supplied by the Green Valley pipe line, direct from the San Dieguito Reservoir.

12th District - Olivenhain - Located in the Encinitas grant, on the north slopes of the San Elijo and joining the San Dieguito Ranch. It has had considerable development and the greater part of the arable land is now in cultivation. It lies at a moderate elevation, mostly below the pumping line, and has

excellent soil. The chances for continued development are good.

Mr. Post's map does not include the entire Olivenhain settlement, nor does my estimate include all of the arable land that might be made available. The Green Valley pipe line would pass over the elevated portion of the district, and from it 86% of the land could be irrigated.

13th District - San Dieguito Ranch - It includes the greater part of the San Dieguito Grant and some fraction of Sections 22, 27 and 4, Townships 13 and 14, Range 3. The fraction in Section 4 is erroneously represented on the quadrangle map, as belonging to District No. 2.

I have classified the lands in this district the same as in the other districts; rejecting those that I considered impracticable to farm, under conditions of moderately dense population. Some of the lands, that have already been plowed and planted to trees, have been rejected on this account. I have included the entire property in my classification, although, the bottom lands, and some others are provided for separately. A copy of the ranch map, herewith, shows the arable lands: yellow for gravity and green for pumping.

The estimate is made up by convenient divisions; all the bottom lands forming one division, while the elevated lands are separated by fence lines or roads, and where not so separated, are indicated on the map.

For the bottom lands I have taken Mr. Kellogg's estimate, 975 acres. To this I have added the following:

Upper Storage Reservoir	42 acres
Lower " "	77 "
Tract marked A O on Kellogg map	35 "
Brought forward	154

Brought Forward	154 acres
Tract marked B 1 on Kellogg map	36 "
Eucalyptus clearing below head-quarters - west of road	72 "
Kellogg's sixty lots	975 "
Total	1237 "

I made no deduction for increased width of river since the last winter's flood.

CONCLUSION

Under the changed condition, I presume Mr. Kellogg will not adhere to his plan for storage reservoirs in the San Dieguito bottom. I scarcely think they would have been useful without the Carroll project, on account of excessive seepage, but with that dam built, whenever the precipitation would be great enough to overflow the Carroll Reservoir, the conditions would be such that no irrigation would be required until after the water had been lost by seepage from the shallow ponds in the San Dieguito bottom. Therefore, the space which Mr. Kellogg appropriated to ponds is available for agriculture. It had a good alluvial soil, before the flood, but it looks pretty sandy at this time.

I have given some thought to the Bernardo Road, which I believe to be impracticable, with the Carroll Dam constructed. To turn this road by way of the Fenton place, I estimate will add three miles to the distance between San Diego and Escondido. The Escondido people will probably oppose this; but it might be some compensation to them, if we give them a road to Del Mar, by way of the Carroll Dam. Such a road will be needed, and some kind of a road will be imperative in building the proposed dam and pipe line. It would also ever after be a convenience for in-

spection and repairs. Again, it would improve the property for colonization purposes, both above and below the dam. Such a road would give the people of Escondido an outlet to San Diego, which could be made better, and but little longer than the Bernardo Road. I mentioned this subject to Mr. Fletcher, but found that he already had it in mind. He has since had surveys made of it, and I am showing it on my maps.

The lengths of conduits given above is from scaling the maps, and may not be very close. The surveyed distance will be greater if any attempt is made to keep upon the hydraulic grade line; while a great amount of syphoning across valleys would shorten the lines. The latter line, being subjected to greater strain would require heavier material.

Mr. Kellogg, in his report of September 22nd, recommends trying to maintain the channel of the San Dieguito River along the county highway south of the ranch house. I think this an excellent idea, and believe that if a narrow ditch were cut for only part of the distance, the river, in the absence of extreme floods, would cut its own channel in the desired location.

Respectfully submitted,

Meredith Jones

CC to E.F.
and E.O.F.

MJ:K

Ed Fletcher Papers

1870-1955

MSS.81

Box: 38 Folder: 10

Business Records - Reports - Jones, Meredith - "The Carroll Irrigation System"

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