ANNUAL REPORT
and
FINANCIAL STATEMENT
of
CHIEF ENGINEER
and
GENERAL SUPERINTENDENT

IMPERIAL IRRIGATION DISTRICT
CALIFORNIA
(and Subsidiary Company in Mexico)

1928

Annual Report
and
Financial Statement
of
Chief Engineer
and
General Superintendent

1928

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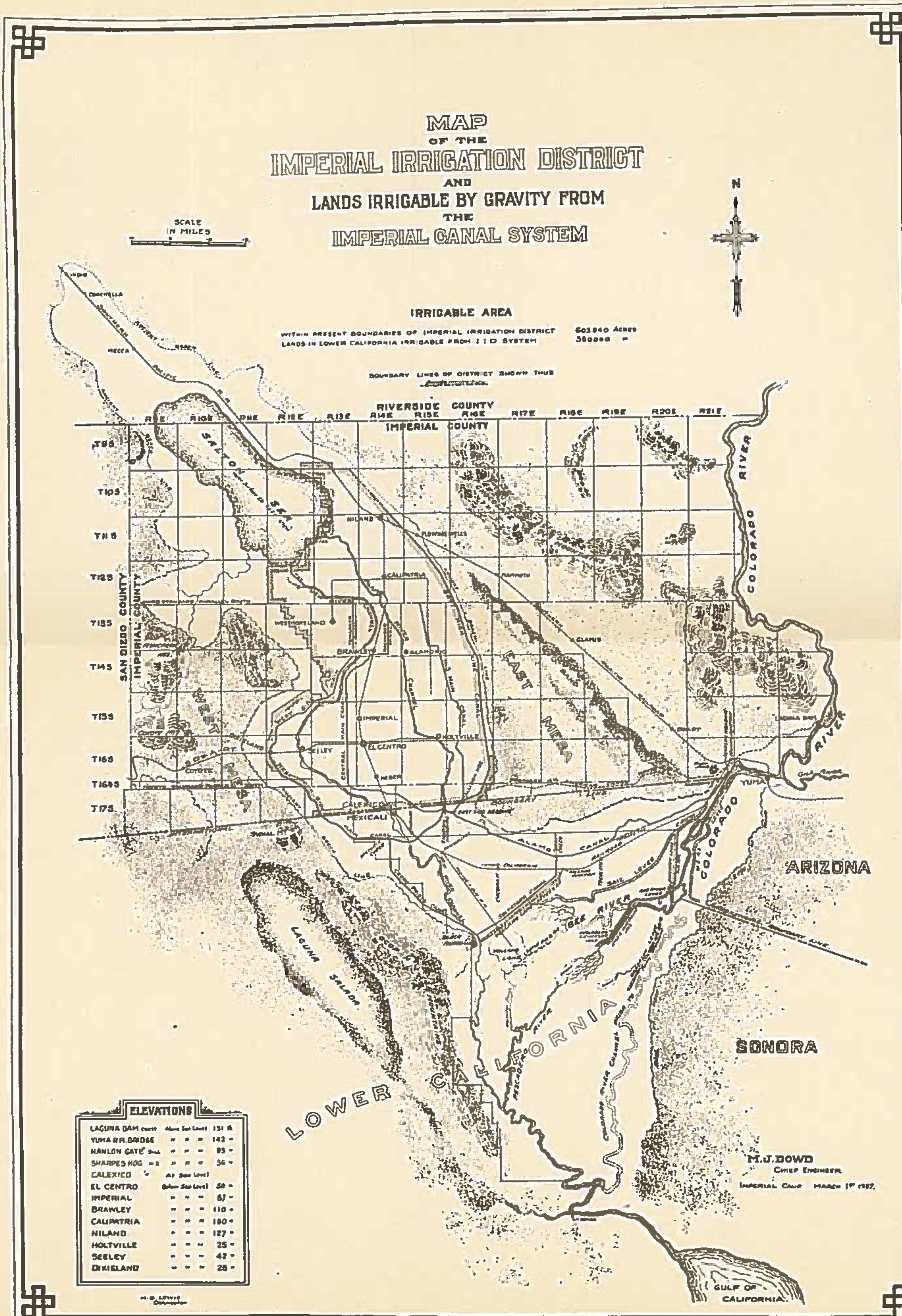
MAP
OF THE
IMPERIAL IRRIGATION DISTRICT
AND
LANDS IRRIGABLE BY GRAVITY FROM
THE
IMPERIAL CANAL SYSTEM
SCALE
IN MILES
N
IRRIGABLE AREA
WITHIN PRESENT BOUNDARIES OF IMPERIAL IRRIGATION DISTRICT 603840 ACRES
LANDS IN LOWER CALIFORNIA IRRIGABLE FROM I I D SYSTEM 360000 "
BOUNDARY LINES OF DISTRICT SHOWN THUS
RIVERSIDE COUNTY
IMPERIAL COUNTY
SAN DIEGO COUNTY
SALTON SEA
EAST MESA
WEST MESA
COLORADO RIVER
ARIZONA
SONORA
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M.J. DOWD
CHIEF ENGINEER
IMPERIAL CALIF. MARCH 1st 1927.

IMPERIAL IRRIGATION DISTRICT

ORGANIZED JULY 25, 1911

COMPRISING 605,000 ACRES

OFFICE OF CHIEF ENGINEER AND
GENERAL SUPERINTENDENT

IMPERIAL, CALIFORNIA
August 6th, 1929.

To the—
Board of Directors,
Imperial Irrigation District,
El Centro, California.

Gentlemen:—

There is herewith submitted the Annual Report for the calendar year 1928, together with a financial statement and other tabulations of interest in connection with operations of the District.

Special attention is called to the financial condition of the District which is shown to be not only very good but also improved as compared to last year. Working Capital as of December 31st was $778,185, an increase of nearly $300,000 over that at the end of 1927 and current surplus for the year shows an increase of $330,000 over that for the previous year.

That strict economy is being practiced is shown by the fact that the total expenses for the year of $2,725,438 are the lowest since the year 1924 and what is even more significant, the total cost of operation and maintenance of the entire project for 1928, amounting to $1,617,615, is the lowest since the absorption of the mutual water companies. This has been accomplished in spite of many added items of cost such as maintenance of 212 miles of deep drains this year as compared to none for the year 1923, construction and maintenance of new outlets to Salton Sea for both New and Alamo Rivers, maintenance of numerous new structures and many additional miles of canals, and a more difficult silt problem.

Although the assessment rate since 1923 has remained the same and the total assessed valuation has been less than that for 1920, it has been possible to provide from current revenue—notwithstanding the many added items of cost previously mentioned—for expenditures on capital accounts and reduction of bonded indebtedness the sum of $2,686,000. Some of the principal items are the following: additions and improvements to canals and structures $476,904; extension and raising of protective levees and works $235,402; Laguna Dam contract $512,000; redemption of bonds $650,000; new equipment and facilities—autos and machinery—$439,904; real estate and buildings $152,390; and Salton Sea overflow rights-of-way $10,590.

That these expenditures could be made without increasing the assessment rate and yet improve the efficiency of the canal system and delivery of water, is indicative of the economy exercised and warrants the consideration of all water users.

Yours very truly,
M. J. DOWD,
Chief Engineer and General Superintendent.

Annual Report and Financial Statement

for Calendar Year 1928

FOREWORD

The year 1928 was one of great importance to Imperial Valley. The outstanding event was the passage by Congress and the signing by President Coolidge on December 21st, of the Boulder Canyon Project Act, commonly known as the Swing-Johnson Bill. Passage of the act is the culmination of a twelve year struggle, during which time this project for the development of Imperial Valley and the Colorado River grew from one of local interest to one of state, inter-state, national, and inter-national importance; from one sponsored by a group of local farmers to one involving issues which figured prominently in the last presidential campaign.

This year also saw a marked improvement in the agricultural depression with which Imperial Valley, together with farming communities in general, has been faced for the past several years. Yields were good and prices much higher with the result of a greatly improved condition of the grower. At the close of the year prospects were good for a continued high level of prices, especially for alfalfa hay, and one of the best lettuce deals in the history of the Valley is anticipated for the coming crop. These improved conditions together with assurance of Boulder Dam are establishing a feeling of confidence in the Valley and the outlook for the coming year is most promising.

Another important event was the approval given in September by the California Bond Certification Commission of the plans for the development and distribution of power in Imperial Valley as proposed by the District. The approval was granted after fifteen months of intensive investigation into all phases of the project by the Commission and now places the District in a position to present the plans to the people for their decision.

ORGANIZATION AND GENERAL FEATURES

The Imperial Irrigation District, organized July 25th, 1911, under the State Law then known as the Wright Act, now the California Irrigation District Act, comprises an area of some 605,000 acres, of which 515,000 acres are irrigable. The estimated population of the District is about 65,000, of which approximately one-half live in the following incorporated cities and towns: Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmoreland.

The elective officials are five Directors, elected by divisions, a Treasurer, and an Assessor and Collector, who are elected in four year periods by a majority vote, cast by duly registered voters living within the boundaries of the District, either on farms or in towns or cities. Directors are elected by groups—those for divisions one, three and five composing one group and those for divisions two and four the other—one group being elected each odd numbered year.

The directors sitting as a board appoint a secretary, attorney, chief engineer, consulting engineers and such other assistants as deemed advisable. The Board has power to transact all business; to equalize assessment valuations made by the Assessor; to establish levies to meet bond interest and redemption; to establish levies, tolls, and charges to meet operation, maintenance and other expenses; and to perform all necessary duties in accordance with the California Irrigation District Act.

The following tabulation shows tenure of office of the various Directors since date of organization:

Name	Division	From		To	
Fritz Kloke	1	July	1911	March	1913
W. O. Hamilton	2	July	1911	October	1916*
H. L. Peck	3	July	1911	March	1913
Earl C. Pound	4	July	1911	March	1915
Porter N. Ferguson	5	July	1911	October	1916*
C. W. Brockman	1	March	1913	October	1916*
Allison Peck	3	March	1913	December	1913*
J. A. McBride	3	January	1914**	October	1916*
John D. Bennett	4	March	1915	October	1916*
J. R. Edmunds	1	October	1916**	March	1921
Leroy Holt	2	October	1916**	March	1919
R. D. McPherrin	3	October	1916**	October	1923*
J. S. Nickerson	4	October	1916**	March	1923
C. D. Manning	5	October	1916**	May	1920*
J. Stanley Brown	2	March	1919	May	1921*
Mark Rose	5	May	1920**		
C. W. Brockman	1	March	1921		
Roy E. Breedlove	2	June	1921**	March	1923
Ira Aten	2	March	1923		
Earl C. Pound	4	March	1923		
Mack Trentham	3	October	1923**	March	1925
Wm. O. Blair	3	March	1925		

* Resigned. ** Appointed

Operations in Mexico are carried on through the agency of the Compania de Terrenos y Aguas de la Baja California, S. A., a Mexican corporation and a subsidiary of the Imperial Irrigation District.

For the purpose of acquiring the properties of the California Development Company, for the absorption of the Mutual Water Companies, for the construction of a system of main drains, and for the construction of additions and betterments to the existing system, four bond elections have been held and bonds voted as follows: First Issue $3,500,000 bearing five per cent interest, voted October 29th, 1914; Second Issue $2,500,000 bearing five per cent interest, voted May 26th, 1917; Third Issue $2,500,000 bearing five and one-half per cent interest, voted September 15th, 1919; and the Fourth Issue $7,500,000 bearing six per cent interest, voted June 1st, 1922.

In 1918 the District entered into an agreement with the United States Government whereby the present intake at Andrade will eventually be moved to and connected with the Laguna Dam, thus eliminating the necessity for the annual construction of a temporary diversion weir in the Colorado River. The contract calls for the payment by the District of $1,600,000 under the terms of the Reclamation Act, of which $640,000 has been paid to date.

Some of the principal duties of the District have been:

Construct and maintain 73.5 miles of protective levees in Mexico, 47.5 miles of which are provided with standard railway and heavily revetted with rock on the water side.

Construct and maintain a channel in Mexico for the diversion of the Colorado River to a new course, known as the Pescadero Cut.

Maintain diversion and headworks to assure an ample supply of water in the canals at all times.

Operate and maintain 137 miles of main canals in Mexico, delivering water to users in Mexico and to various points on the International Boundary.

Operate and maintain 1700 miles of canals and laterals in the United States and distribute water to some 6,000 users on less than twenty-four hours notice.

Maintain 626 miles of surface drain ditches for removing waste water from a considerable portion of the Valley.

Locate and construct drainage outlets for the entire District and maintain 227 miles of such outlets constructed to date.

Control the Alamo and New River Channels and maintain their outlets into the Salton Sea.

Colorado River Development:

During the spring session of Congress, both the House and Senate Irrigation committees after extensive hearings reported favorably on the Swing-Johnson Bill. On May 25th the bill was passed by the House and sent to the Senate where it was brought up for consideration but a vote was prevented by an extensive filibuster on the part of the opponents of the measure. However, just prior to the summer recess, Senator Johnson was able to obtain an order making it the unfinished business of the Senate.

Accordingly, when Congress convened in December the bill was first on the Senate calendar and after considerable debate was passed by that body on December 14th by an overwhelming majority. The amended bill was concurred in and passed by the House on December 18th and became a law when signed by President Coolidge on December 21st.

The Boulder Canyon Project Act, the name of the approved Swing-Johnson Bill, provides for the construction of the Boulder Dam and All-American Canal as being the first step in the development of the Colorado River. To be effective, the act requires seven state ratification of the Santa Fe Compact or if such is not had within six months of the date of passage, the ratification by six of the states including California will be sufficient. This provision of the act was intended to give Arizona additional time to sign the compact and it is expected that conferences of the Lower Basin states will be held looking toward that end.

Although construction of the project must await settlement of the compact, the passage of the act virtually assures the dam and the canal. Too much praise and credit cannot be given Senator Johnson and Congressman Swing for their untiring efforts in behalf of this great project which means so much to Imperial Valley and the entire Southwest.

OPERATIONS FOR THE YEAR

General Administration:

There were no changes of any consequence during the year as regards the directing of the general operations of the District. The operating headquarters located at Imperial, includes among others, the following departments: Accounting, General Water Operations, Water Accounts, Engineering, Mechanical, and Purchasing. The general machine shops, garage, and general stores and material yards are also located at Imperial. Local operations are handled through division offices each in the charge of a superintendent, who is responsible for the canal system and delivery of water in his territory.

It has been found that a centralization of the work provides many facilities for the more efficient and economical operation of the District than would otherwise be possible.

Under the agreement of December 6th, 1927, with the Niland Water District, the Imperial District has made surveys and prepared plans and specifications preliminary to the construction of a distributing system for the 16,000 acres lying north of Niland and comprising the Niland District. Bonds for the construction of this system in the amount of $140,000 have been approved by the California Bond Certification Commission and it is expected that bids for the construction work will be called for in the near future.

Colorado River Diversion:

With the exception of a short period in September, the flow of the River was ample at all times to meet the demand and no unusual diversion difficulties were encountered. Due to the constant sluicing and silting of the head end of the Alamo Canal, close regulation of flow has heretofore been impossible.

However, this year after many months of investigation it was found possible to regulate the flow from a gage located at Alamo "B" some eight miles below the heading. At this point an automatic recorder and float alarm were installed and direct telephone connection provided with the hydrographer and gate tender at Andrade. This method of controlling the flow has resulted in much better regulation and has eliminated many of the large fluctuations which have caused so much difficulty heretofore.

From a diversion of 1500 second feet on January 1st the demand increased by varying stages to the maximum for the year of 7255 second feet on July 25th, thereafter decreasing to a minimum of 2600 second feet on December 30th. The total diversion for the year amounted to 3,271,529 acre feet, or 25.6 per cent of the discharge of the Colorado River at Yuma. The amount diverted was 182,388 acre feet more than that of the previous year.

The following indicates the demand throughout the year:

DIVERSION

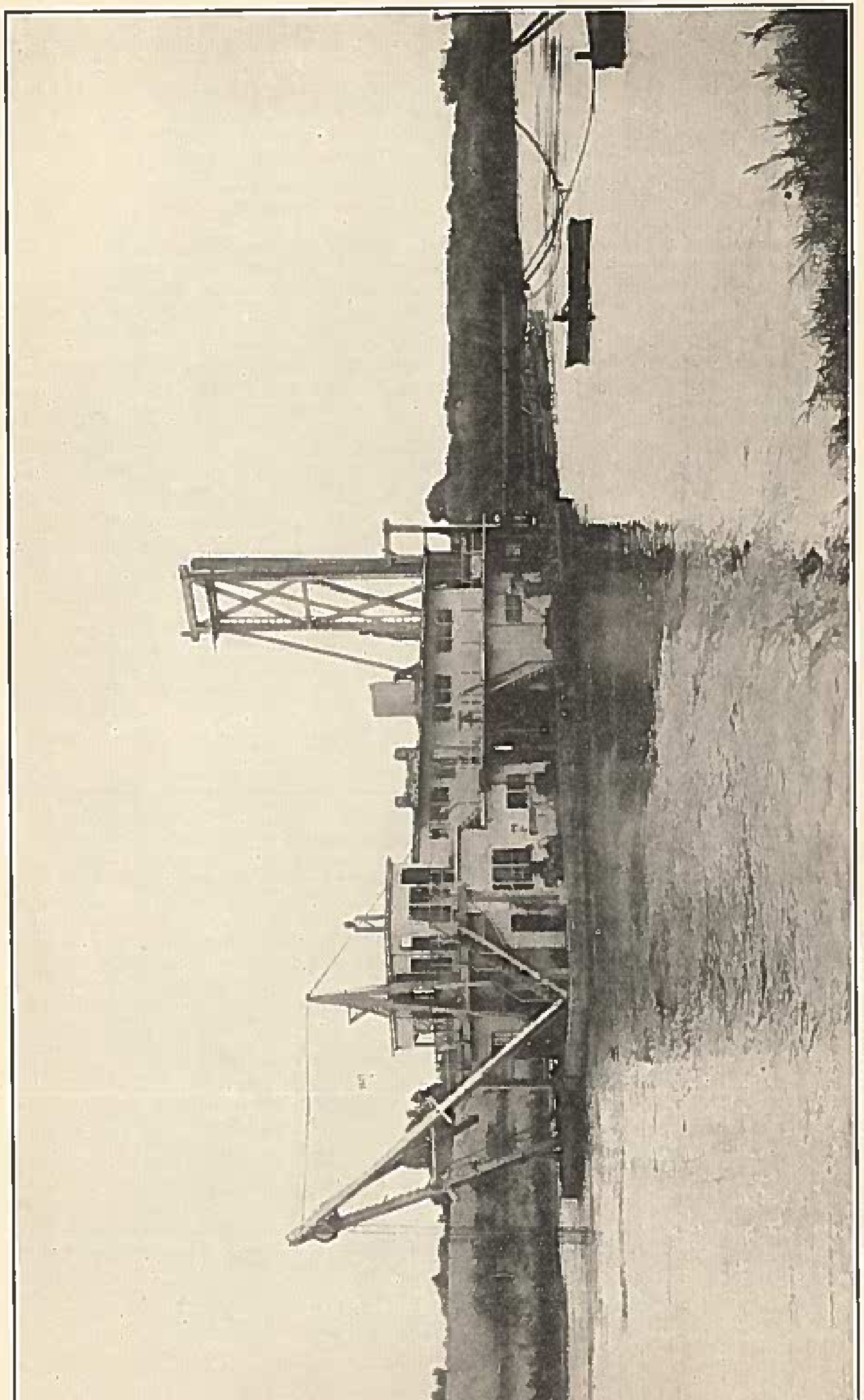
	Daily in Second Feet					Total Monthly
	Maximum		Minimum		Mean	In Acre Feet
January	3,000	24th	1,426	2nd	2,301	141,475
February	3,751	29th	2,328	5th	3,017	173,518
March	6,558	28th	3,019	11th	4,812	295,874
April	6,700	5th	4,907	29th	6,029	358,721
May	5,439	2nd	3,910	20th	4,630	284,658
June	6,768	27th	5,290	3rd	6,165	366,815
July	7,255	25th	5,800*	6th	6,314	390,172
August	6,850	22nd	5,629**	31st	6,251	384,342
September	6,010	3rd	3,250	25th	4,796	285,372
October	4,875	7th	3,407	28th	3,963	243,646
November	3,700	29th	2,275	26th	3,031	180,349
December	3,450	11th	2,600***	30th	2,800	166,586

* Exclusive of major cuts due to breaks on the Alamo and East Highline.

** Exclusive of unusual cut on the 2nd to recover ladder on Dredge "Brawley."

*** Exclusive of cut-out of system east of New River.

For the second successive year it was not found neccessary to construct the temporary diversion weir. This is due to two factors, one being the general raising of the bed of the river, and the other being the low flood peak which did not scour the bed of the river to an excessive depth. However, the annual contract with the Yuma Water Users' Association for the building of the weir was executed. Under the terms of this contract the District furnishes a bond in the amount of $500,000 to protect the Yuma Valley in case damage should result from the construction of the weir.



DREDGE CALEXICO—IN ALAMO CANAL AT ANDRADE

It was contended, prior to the flood season, by the Secretary of the Yuma Water Users' Association that the portion of the weir remaining in the river was a serious obstruction to the flow, causing higher river levels and thereby increasing seepage into the upper end of the Yuma Valley. Investigation by the District showed that while the river level was higher than several years ago, this was not due to the weir, which had been practically all removed, but rather to the gradual raising of the river bed from Yuma to the delta in Mexico. In fact, at the maximum flow for the year the difference in the river gage immediately above and below the weir was found to be only one-tenth of a foot.

During the low flow of the river diversion was controlled by a sand dam which was constructed a short distance below the Rockwood intake gate, material being obtained from dredging the head end of the main canal. The entire flow of the river was diverted during September except for two short periods when the dam was breached as a result of sluicing operations at Laguna Dam. The sand dam was in operation from August 23rd to October 18th, after which latter date the flow was such as to make it unnecessary.

Dredging of the settling basin between Rockwood and Hanlon Gates was commenced on May 10th, about twenty days earlier than for last year. From this date until October 22nd Dredges Brawley and Calexico were used alternately, excavating a total of 997,600 cubic yards, as compared with 1,340,600 cubic yards for last year. Considerable difficulty in dredging was had by reason of the enormous amount of debris in the bottom of the canal which continually clogged the pumps. As a result it has been decided to install a pump of new design on the "Brawley" which will be better able to handle debris.

Water Distribution—General:

The demand for water during the year, for both the United States and Mexico, was greater than during the previous year by 326,468 acre feet. That of the United States was 14.37 per cent and of Mexico 24.18 per cent greater than for 1927.

With the exception of a short period in September when, due to low flow of the Colorado, it was found necessary to prorate water to the divisions, no trouble was experienced in delivering on demand.

Improvements to the system during past years are being reflected in a more satisfactory functioning of the canals.

Deliveries to users in the United States amounted to 1,494,831 acre feet, or 187,801 acre feet more than for the year previous. Those to users in Mexico amounted to 712,255 acre feet, or 138,667 acre feet more than for the year previous.

Of the 3,271,529 acre feet diverted, 1,494,831* acre feet, or 45.7 per cent, was delivered to users in the United States and 712,255 acre feet or 21.8 per cent delivered to users in Mexico; the total deliveries amounted to 2,207,086 acre feet which is 17.36 per cent greater than the deliveries during the previous year.

Water Distribution—Mexico:

The demand for water this year was much heavier than for last year and, although there was a partial shortage in September, it was not necessary to prorate. Bed silt continued to be the cause of considerable difficulty, although not as serious as in past years, due to the improvements which have been made to the canal system.

On July 8th a break was had in the north bank of the Alamo Canal at Kilometer 52 followed by another on July 11th near Kilometer 51. In both

* Based on "Gate Measurements" which tests show to be ten per cent low.

cases the water was cut out of the canal but owing to the fact that neither breach exceeded thirty-five or forty feet in width, repairs were quickly made and water service resumed within 48 hours. The flood water from the second break covered practically the same area as that from the first one and although a few acres of cotton were destroyed the total damage was not large.

Silting in of borrow pits was carried on at several points along the Alamo and Solfatara Canals. At one point on the north bank of the Alamo Mocho Cut-off it was impossible to dispose of the desilted water and it therefore had to be pumped back into the canal. However, this was found to be too expensive and the silting was discontinued, it being planned to fill the borrow pit with material to be dredged out of the canal.

By reason of the success of experiments made last year in the use of steel tripods for controlling bank erosion on the upper Alamo Canal, the use of pile and brush jetties has been discontinued. This year several hundred tripods were installed and not only has it been found that the cost is less but also the work is much more permanent. In fact, at several points where in the past repairs were required continually, the situation has been completely controlled by the steel tripods, making further attention unnecessary.

Dredging operations for the year were considerably less than for last year. The Carrillo Bend and Ash Canals were widened and deepened and the banks raised and stengthened. On the Alamo Canal the south bank was raised and strengthened throughout the major portion of the Alamo Mocho Cut-off and the north bank raised and strengthened and the channel straightened in the vicinity of Kilometer 51.

Mileage dredged was as follows:

Carrillo Bend	4.0 miles
Ash	2.0 miles
Alamo	6.5 miles
Total	12.5 miles

During the year one new pumping plant, known as Alamo "E," was installed on the north bank of the Alamo a short distance below Tecolote Heading for the irrigation of 9300 acres of the Daugherty Tract. Several of the existing plants were enlarged and a few new delivery gates installed by the users. However, this activity was much less than for last year. At the present time there are the following pumping plants installed on the canal system in Mexico.

Name	No. of Units	Capacity In Second Feet
Alamo AA	1	20
Alamo A	3	70
Alamo B	7	630
Alamo C	2	80
Alamo CA	2	70
Alamo D	1	10
Alamo E	1	120
Solfatara B	2	70
C. P. No. 11	1	60*
C. P. No. 12	1	60*

*Not in use at the present time.

In November extensive repairs were made to the West Side Main Flume over New River which has been in constant use since the date of its completion in May, 1915. The flume consists of a rectangular timber box six feet high, twenty-two feet wide, and eight hundred and twenty-two feet long, carried on a pile trestle.

The repairs consisted of replacing the original 1x12 Redwood ship-lap lining with similar material of two inch thickness and renewing of posts and braces which had deteriorated. Much of the old lining had been washed away and that remaining had been scoured to a thickness of one-fourth to three-fourths of an inch. Also it was found that sand and silt had deposited between the lining and the outside wall, varying in thickness up to one and one-half inches. The following material and labor were used in making the repairs: 35,000 board feet of lumber; 11 kegs of nails; 1240 machine bolts; and 385 gallons of Valdura paint. In order to make the water cut-out as short as possible the repair work was organized in every detail and as a result the entire job was completed in seven days.

During March a sluice gate was constructed from the Wormwood Canal to the West Side Main at a point about 1500 feet below Wardlaw Check. The use of the sluice gate has made it possible to keep the head end of the Wormwood Canal open and precluded the necessity of dredging such as was done last year.

Minor repairs were made to the Solfatara Heading, Wistaria and Tortuoso Checks, and Lawrence Heading. Although no repair work was done on Cudahy Check this year, it was thoroughly inspected and plans made for repair work to be done next spring.

The Trevino pile bridge across the Alamo Canal at Kilometer 42 was completely renewed and extended on the south end. This bridge serves a large area on the north side of the Alamo Canal and was therefore reconstructed to withstand heavy traffic. The work was started in the latter part of August and completed October 1st.

The crop report for the year showed 191,446 acres in cultivation as compared with 156,168 acres for the previous year. Of the 191,446 acres, 19,700 acres were irrigated principally from the siphons installed this year at Pescadero Dam.

Acreage shown for various crops was as follows: cotton, 153,351, or 80.1 per cent; alfalfa 29,377, or 15.4 per cent; grains 7100, or 3.7 per cent; and miscellaneous 1618, or 0.8 per cent.

The water duty in acre feet per acre for the past four years has been as follows: 1925, 3.36; 1926, 3.53; 1927, 3.67; and 1928, 3.82.

Water Distribution—United States:

The following tabulation gives relative data for the various divisions:

Division	Miles of Canals	Miles of Surface Drains	Irrigable Area	Water delivered in Acre Feet
Holtville	350.6	112.3	100,000	263,606
Imperial	423.2	10.5	127,000	345,792
Brawley	460.0	259.0	142,000	459,859
Calipatria	348.4	237.4	103,000	288,617
Calexico	126.4	6.7	43,000	136,957
Total	1,708.6	625.9	515,000	1,494,831

The demand for water during the year was unusually heavy and canals were taxed to capacity. In fact, the delivery of 1,494,831 acre feet is the largest of record. For a short period in September, it was necessary to prorate water to the several divisions, due to a partial shortage in the river, but no crops suffered. Bed silt caused trouble in a number of the canals especially at the heads of the Birch, Dogwood, Elder, Thistle, Briar, and and Ash and its effect was noticed in laterals as far north as Niland.

The water duty for the year was 3.67 acre feet per acre as compared with 3.36 for last year. These figures are based on "Gate Measurements" which are at least ten per cent low, as shown by tests. This means that the actual duties were 4.05 and 3.70 acre feet per acre respectively for the two years.

A tabulated summary of the crop report for 1928 is given on page 48. The net cropped area for the year was 406,943 acres or about 18,000 acres more than for last year, while the amount of water delivered to the land was 1,494,831 acre feet.

A comparison of the silt content of the water for the years 1927 and 1928, in per cent by volume, is shown by the following tabulation:-

Silt Content, Central Main at Dahlia Heading
In Per Cent. by Volume

	1927			1928		
	Max.	Min.	Mean	Max.	Min.	Mean
January	1.50	0.50	0.73	0.83	0.43	0.57
February	4.73	0.53	1.53	3.85	0.43	1.58
March	9.00	1.50	3.09	1.78	0.55	1.14
April	5.00	1.00	2.45	3.15	0.68	1.55
May	2.80	0.80	1.50	2.28	0.85	1.46
June	1.00	0.63	0.78	1.80	0.60	1.15
July	6.00	0.08	2.62	4.22	0.45	0.83
August	12.00	0.62	5.05	5.43	1.20	2.39
September	22.50	2.75	9.31	7.00	1.30	3.20
October	No readings during month			14.60	0.65	3.35
November	3.80	1.00	2.20	12.50	1.50	4.89
December	1.35	0.53	0.85	1.55	0.63	1.12

The most serious break in a large canal which the District has experienced in many years occurred early on the morning of July 14th at a point on the west bank of the East Highline Canal approximately one-eighth of a mile above the Pear Canal Heading. The cause of the break was leakage through a gopher hole near the high water line, which got beyond the control of the patrolman. It was over six feet wide before assistance arrived. As the canal was carrying 1800 second feet, it was necessary to cut out the water at Hanlon Heading, which was done immediately, and crews and equipment rushed to the scene from various parts of the Valley. A drag line working nearby was moved to the break, temporary telephone installed, and lighting plant erected for night work.

The first drop reached the break at about 5:30 P. M.,and at 11:30 A. M., the following day (July 15th) the first closure was made and by 4:00 P. M., the dredge had completed a temporary fill across the breach. The first water was turned back into the canal at 5:30 A. M., on the 16th and increased to 1400 second feet by the afternoon of the 17th and to full flow by the 21st. In making the first closure over 16,000 sacks filled with earth were used.

The flood water from the break damaged several hundred acres of crops but owing to the efficient manner in which the drains carried off the water the damage was reduced to a minimum. Flood water from the break washed out a large section of the Pear Canal from which the City of Holtville receives its water supply and a serious situation was narrowly averted by obtaining a rush order of 66 inch corrugated iron pipe from the

coast, which was placed across the breach in the Pear Canal, delivery to the city of Holtville being resumed only a few hours before the water supply was exhausted. The total cost of the break including payment of damage claims and repairs to the drainage system amounted to approximately $35,000.

During the year the old wooden headings at Pomelo and Township Canals on the East Highline were renewed with reinforced concrete structures and 36 inch diameter reinforced concrete outlet pipes.

The increased velocity in the East Highline Canal resulting from the greater flow which has existed for the past several years sluiced out the bottom of the canal above the Third Standard to a point where it was difficult to make delivery to the laterals during low water. For this reason in the fall a check was constructed in the Highline at the Third Standard using rubble masonry. The rock was obtained from the Calipatria quarry.

Silting of borrow pits along the East Highline was continued this year. The principal work was between Laterals 2 and 11 and from the Orchid to the Oleander. In both cases, water was allowed to run through the borrow pit from one lateral to the next, the silt thus deposited filling the borrow pit and strengthening the west bank of the canal. Some silting was also accomplished on the east side of the East Highline above and below No. 1 Check.

In order to maintain capacity at the head of the Dogwood Canal a sluice gate was constructed a short distance downstream from the Calexico Highway into the Central Main. The use of the new sluiceway together with the one at the lower end of the canal made it possible to maintain a greater discharge in the Dogwood than heretofore.

Due to erosion immediately below the Double Weir Check on the Central Main Canal which threatened the safety of the Dogwood Canal, a sheet piling wall was driven for a distance of about seventy-five feet below the check.

For the past two years silting of the head end of the Briar Canal has given a great deal of trouble. Bed silt has also caused difficulties at the upper end of the Birch Canal. To relieve these situations a sluiceway was constructed from the Briar to the Central Main at the Birch Check. Sluicing out the head of the Briar not only increases the capacity of that canal but also creates a basin which catches the bed silt and prevents it from plugging the head of the Birch Canal. This structure consists of a screw lift gate connected to a 48 inch reinforced concrete pipe placed at an angle with the Briar so as to obtain maximum sluicing effect.

In February the 60 inch corrugated iron pipe portion of the Hemlock Sluiceway on the East Side Main Canal failed and twenty feet of the pipe collapsed. Investigation showed that the corrugations had been cut through by the action of the silt in the water for a width of four feet on the bottom of the pipe, the leakage from which had undermined the outlet to such an extent that it failed. Repairs were made by extending the reinforced concrete barrel of the sluiceway 52 feet. Owing to ground water it was necessary to use piling as a foundation for the extension.

The spreading of Bamboo Cane on many parts of the main canal system is causing serious difficulty. The growth is very rapid, especially along the waters edge and increases the building of berms, resulting in a choking of the canal section in a very short time. Experiments are being made on eradication of the cane, as this is becoming a most serious problem with which to contend.

In accordance with the agreement entered into last year with the City of El Centro, the District eliminated the portion of the Date Canal through the city. This work required the connection of the Date Canal and Dahlia Lateral 1 at the south city limits of El Centro to the Dogwood Canal, the construction of a connection from the Dahlia Canal to serve that portion of the Date Canal north of the city and the moving of the existing Date pump from Mulberry Street to the north city limits and installation of one-half mile of 18 inch pipe line east from the new location. It was also necessary to enlarge the Dahlia Headgate and Dahlia Canal down to the north side of El Centro, including the reconstruction of four large highway siphons and all existing checks and bridges. With the exception of the enlarging of the Dahlia Canal the entire cost of the work amounting to approximately $45,000 was paid by the City.

Considerable work was done in connection with the enlargment, realignment, and extension of laterals and canals during the year. The upper portion of the Eucalyptus Lateral 4 was enlarged and extended one and one-half miles to connect with the Eucalytus Lateral 5, thereby eliminating entirely Lateral 6, which paralleled the San Diego Highway, and also eliminating the dead end of Lateral 4. One-eighth of a mile of the Barley Lateral was relocated because of continued caving of the north bank of the Dahlia Wasteway. Enlargment of the Peach, Plum, and Pampas Laterals was continued to take care of the increased demand due to the abandonment of the Low Line Canal. Mesa Lateral 5 was extended one-quarter of a mile. One-half mile of side lateral was constructed along the Trifolium No. 7 Surface Drain, which had previously been the lateral. One-half mile of the Trifolium Lateral 2 north of the old Westmoreland Highway was moved to the west to provide sufficient distance for the sluicing back of Trifolium No. 2 Surface Drain. The Tenth Street Lateral in Holtville was taken over and enlarged.

As already noted, considerable difficulty was had with the silting of the Birch Canal from the head to the Calexico Highway. As this portion is concrete lined, it was necessary to shovel it by hand which was quite expensive and because of the rapid silting, it was not possible at times to meet the demand. Although the construction of the Briar Sluiceway will in a large part remove the trouble, nevertheless, it is also planned to raise the concrete lining next spring to insure sufficient capacity.

At the request of the owners, arrangements were made to silt in approximately one hundred acres of land lying along the east side of the Ash Canal north of the International Boundary. This area is very low and lies in a pocket which is difficult to drain. A levee was built around the area and the Ash Canal turned in at the south end. The clear water, after the silt had deposited, was returned to the Ash at the north end of the area. Not only is the land benefited by being raised several feet but also the District is benefited in a reduction in the cost of maintaining the canal below that point by reason of the silt being eliminated. There are a number of similar areas along the east side of the Ash Canal and it is expected that these will also be silted in in the near future.

Many new structures were constructed on the canal system this year. A pile bridge was built across the East Highline and Mesa Canals on the new Calexico-Yuma Highway, the County of Imperial paying for one-half the cost. Concrete lined spillways were constructed at the end of the Ninth Street Canal, Holtville, and also on the Fern and Elm Canals. Failure of the wasteway structure on the Schenk Canal at the intake of the Alamo River siphon and failure of the spillways at the end of the Rockwood Canal into New River and on "C" and "G" Laterals at the Alamo River necessitated the reconstruction of these structures, reinforced concrete being used for the Schenk structure and rubble masonry for the others. The siphon on the Peach Lateral at Holt Avenue was renewed with a 36 inch concrete pipe and lowered several feet. The siphon on the Dogwood Canal on the Holtville Highway east of Imperial was renewed using reinforced concrete

pipe and relocated so as to permit the widening of the Dogwood road, one-half the cost of the work being paid by the County of Imperial. Extension of Eucalyptus Lateral 4, already mentioned, required the enlarging of one siphon on the existing canal and the installation of a new siphon under the San Diego Highway—this being paid for by the State Highway Department—and one under the San Diego and Arizona Railroad; also the installation of several wooden checks and deliveries.

A large number of rubble masonry structures were built, including the check in the Highline at the Third Standard, the reconstructed Rockwood Spill to New River, crossovers on the Nettle and Nutmeg Laterals, spillgate at end of the Riley Lateral to New River, and many checks and deliveries.

After several months of discussion permission was given by the Southern Pacific Company to use rubble masonry structures and reinforced concrete pipe barrels for railroad crossings south of Niland. Three structures of this type were installed during the year; one being the renewal of "G" Lateral crossing, one for "F" Surface Drain, and one for "G" Surface Drain. In connection with this work crossovers were constructed just east of the railroad, thereby making it unnecessary to empty drain water into laterals at these two points.

There was considerable activity in the construction and deepening of surface drains this year in cooperation with the water users. Of particular interest is the water wheel which was developed and tried out at the Gates Surface Drain along the Ash Canal. Tests of the water wheel have shown it can be installed at small cost and requires practically no operating attention with the result that in the future many of these will be installed for lifting water out of short drains where no outlet is available. In constructing the surface drains, the policy adopted by the District provides that the water users shall furnish and clear the right-of-way and pay for the cost of excavation and private bridges, the District standing the cost of public road and canal crossings. Among the surface drains built under this policy are the following: Brockman, Carr, Carpenter, Whitcomb, Acacia, Rose No. 3, Tamarack, Baughman, McCune, and Trifolium Nos. 1, 3, 7, 8, 9, and 10. Most of these drains were only partially completed this year, it being planned to continue the work during 1929.

The sluicing back of laterals and surface drains emptying into New and Alamo Rivers, which was started several years ago, was continued this year. These deepened canals are proving of much value not only to the adjoining land for drainage but also in providing a means of sluicing which decreases the cost of maintenance.

The following tabulation shows the amount of repairs and construction required during the year, in connection with canal structures:

CONSTRUCTION, REPLACEMENT AND REPAIR OF STRUCTURES

Division	Deliveries	Checks and Drops	Bridges	Misc.	Total	Constructed or Replaced
Holtville	115	113	21	0	249	217
Imperial	195	150	70	0	415	220
Brawley	128	146	21	32	327	310
Calipatria	31	51	9	0	91	220
Calexico	125	109	7	20	261	65
Total	594	569	128	52	1,343	1,032

Work was continued on the eradication of noxious weeds, particularly Camel Thorn and Johnson Grass, favorable results being obtained. The

Bamboo Cane which has badly infested the main canals is rapidly spreading to the laterals and presents a problem which will have to be solved. During the year experiments were made with a power sprayer but the results obtained did not justify the cost. However, it is hoped that some inexpensive chemical can be found which will prove economical and satisfactory for this work. The cost of brush clearing now amounts to nearly $150,000 per year and because of this large item of expense, various mechanical methods are being considered to do the work instead of using hand labor as at present.

Mileage of canals, laterals, and surface drains as of December 1st, 1928, arranged according to method of maintaining together with a comparison of the amount of work done in 1927 and 1928, is shown in the following tabulations:

MILES OF CANALS AND SURFACE DRAINS
(Classified according to the method of maintaining)

	Canals			Surface Drains		
	Dredged	Ruthed	Shoveled	Ruthed	Shoveled	Total
Mexico	124.6	12.4	0	0	0	137.0
Holtville	19.5	289.0	42.1	106.2	6.1	462.9
Imperial	24.8	315.8	82.5	9.0	1.5	433.6
Brawley	25.0	426.1	8.9	252.5	6.5	719.0
Calipatria	0	319.8	28.6	219.6	17.8	585.8
Calexico	16.5	92.9	17.0	6.7	0	133.1
Total	210.4	1,456.0	179.1	594.0	31.9	2,471.4

Summary of Cleaning Operations Miles Dredged One Side, Miles Shoveled

1 9 2 8

	Canals			Surface Drains		
	Dredged	*Ruthed	Shoveled	*Ruthed	Shoveled	Total
Mexico	12.5	0	0	0	0	12.5
Holtville	17.6	753.3	64.4	139.0	5.5	961.8
Imperial	0	623.6	143.8	2.5	2.0	721.9
Brawley	2.0	415.0	52.0	231.0	26.0	726.0
Calipatria	0	490.1	18.5	227.2	0	735.8
Calexico	0	274.4	32.8	0	0	307.2
Total	32.1	2,538.4	311.5	599.7	33.5	3,465.2

1 9 2 7

Mexico	24.1	3.6				27.7
Holtville	5.1	561.5	89.6	85.5	8.3	750.0
Imperial		690.2	173.2	15.7		879.1
Brawley	1.0	505.8	74.3	109.4	10.0	700.5
Calipatria		491.6	21.6	231.8		745.0
Calexico**		154.1	18.0			172.1
Total	30.2	2,406.8	376.7	442.4	18.3	3,274.4

*Includes Clark and Buckeye dredges.
**From July 1st, 1927.

RIVER PROTECTION:

The spring snow-pack on the upper watershed of the Colorado River, as shown by early reports, was much less than normal and indicated a low

run-off, which was borne out by the actual discharge for the year of only 12,781,000 acre feet as compared with that of 17,095,000 for the year previous and with the 27 year average of 16,301,000. There was no flow in the Gila River at the junction with the Colorado except during the month of February when the discharge amounted to 22,600 acre feet. This is the lowest yearly discharge of the Gila since 1903 and is 807,141 acre feet under the past twenty-six year average of 829,741.

The following tabulation in cubic feet per second indicates the variations in the flow of the Colorado at Yuma throughout the year:

Date	Discharge	Date	Discharge	Date	Discharge
Jan. 1	3,890L	May 1	12,800L	Oct. 3	2,370L
Jan. 25	8,340H	May 23	71,900H	Oct. 18	3,700
Feb. 5	5,730L	June 1	64,400	Oct. 19	11,500
Feb. 13	10,900H	June 13	98,800H	Oct. 22	17,800H
Feb. 23	6,390	June 28	36,000L	Oct. 25	9,460
March 1	6,760L	July 4	38,800H	Nov. 5	5,820L
March 20	11,300H	July 31	14,900L	Nov. 8	14,300H
March 28	7,880	Aug. 1	14,300H	Nov. 24	6,900
April 1	12,600	Aug. 31	4,400L	Dec. 1	5,730
April 5	22,300H	Sept. 2	8,910H	Dec. 9	6,690H
April 10	14,800	Sept. 29	2,390L	Dec. 31	2,020L
April 26	7,760L				

H. Maximum for Month.
L. Minimum for Month.

The maximum discharge for the year was 98,800 second feet on June 13th as compared with June peak for 1927 of 74,100 second feet. The minimum for the year of 2,020 second feet on December 31st was slightly under that for the year previous of 2,620 second feet.

A tabulation showing the discharge of the Colorado at Yuma and diversion at Hanlon Heading by years since 1913 is shown on page 45 and gives the following: discharge by years, maximum daily discharge with date, minimum daily discharge with date, diversion by years at Hanlon, maximum diversion with date and minimum diversion with date.

The work of raising and strengthening the Bee River and Pescadero levees from Mile 19 to the end (Mile 31¼), commenced in November, 1927 was continued this year until completion on March 9th. Due to saturated soil conditions adjacent to the Bee River Levee between Miles 20-¾ and 22, it was necessary in raising this stretch to haul material in dump cars from borrow pits established at some distance back of the levee. For the balance of the work material was obtained from either the river or land side adjacent to the levee. A total of 192,714 cubic yards of material was used in this work and the raised portion revetted with rock.

Because of the seeped condition on the land side between Miles 20-¾ and 22, a small levee was thrown up on firm ground back of the main levee, being connected at either end to the latter. It is planned to silt in this area during high water, thereby not only reinforcing the main levee but also providing material for raising when necessary.

The situation along the levee system during the flood season was better this year than for many years. The flood peak was not high and at no point did the river attack the levee system; only 30,700 cubic yards of rock and 1700 cubic yards of gravel being used for revetment. The rock was placed principally at Miles 23, 24, and 25 to provide additional strength in anticipation of a possible attack by the river. Although the river did not attack this stretch during the present season, it is quite probable that it will do so next year. The levee system was patrolled night and day during the flood season and daily during the balance of the year. It may be stated that the protective levee system as a whole was in better condition at the end of the year than ever before.

During the spring, the Colorado River Land Company installed five siphons at the lower end of Pescadero Dam,—three of thirty-six inch and two of forty-two inch diameter—having a total capacity of about 600 second feet. The installation was completed in March and the siphons used thereafter for diverting water through the old Bee River Channel below the dam for irrigation of land in Volcano Lake Basin. The subsidiary company of the District protested against the installation of the siphons on the basis that they constituted a menace to the safety of the levee system. Nevertheless, permission was granted for the installation but rules and regulations were formulated by the Mexican Government for safeguarding the levee system in the operation of the siphons.

TELEPHONE SYSTEM:

A fire occurred in the telephone room of the headquarters building at Imperial during the night of October 20th which destroyed the switchboard and did considerable damage to fixtures and contents of the room. A temporary installation of a thirty station board was immediately made in the general water office and new equipment ordered. It is anticipated that all repairs will be completed and new equipment received and installed the earlier part of next year. Service is being maintained satisfactorily at present with the temporary equipment.

New construction during the year included an eight mile line from Andrade to the Alamo "B" hydrographer house in Mexico to be used for reporting changes in gages at the latter point for regulation of the diversion; and in the United States a two mile line to connect with the new Orange Zanjero House.

Maintenance work in Mexico required the replacement of 39 poles, stubbing or resetting of 86 others, replacing of 7 anchors and in addition, brushing and other general work.

In the United States the maintenance work included the replacement of 147 poles, resetting or stubbing of 160 poles and the replacement of 12 anchors.

Considerable special work was done in connection with the development of the new Gas-Electric dredge, the maintenance of regular dredge equipment and general office and field work.

The telephone system at the close of the year consisted of the following: Mexico—149.9 miles of poles, 248.9 miles of circuits, 46 telephones, 11 gongs and 1 switchbox; United States—187.9 miles of poles, 426.7 miles of circuit, 2 switchboards, 4 switchboxes, 175 telephones and 12 gongs. Total United States and Mexico—337.8 miles of poles, 675.6 miles of circuit, 221 telephones, 23 gongs, 2 switchboards and 4 switchboxes.

This shows a decrease of 4 phones and 5.1 miles of line and an increase of 17.7 miles of circuit as compared with figures for the previous year.

The District also makes use of 47.3 miles of foreign pole line.

EQUIPMENT, PURCHASES, AND RENEWALS:

Equipment purchases were considerably less than for the year previous and included: ten new model Ford cars, two small portable pumps, and two Fyrfreeze fire extinguishers with hand trucks.

The following is a partial list of equipment now in use:

2 Locomotives	1 Buckeye Desilter
2 Locomotive Cranes	2 Steam Shovels
50 Air Dump Cars	2 Power Graders
1 Ballast Spreader	9 Pile Drivers
2 Electric Suction Dredges	1 Browning Truck Crane
18 Draglines (½ to 1½ yards)	34 Trucks
1 Imperial Gas-Electric Dredge	82 Autos
35 Ruth Dredges	140 Horses and Mules
1 Buckeye Trencher	

DRAINAGE:

On December 31st, 1927, there remained of the funds for the construction of a drainage system, made available by the sale of two and a half millions of bonds voted for that purpose in 1922, the sum of approximately $83,000. The proposed construction to be made from this fund, as originally planned and later enlarged, was completed at that time except for 3.7 miles of drain with appurtenant structures.

It was estimated that with this work completed, there would remain $133,000 available for further construction. Therefore plans were prepared for an additional eight miles of drains and request made of the California Bond Certification Commission for a reallocation of remaining funds to provide for this construction. The plans were approved and work authorized on September 26th.

During the year there was expended for drainage construction the sum of $74,116, of which $61,156 was from the Construction Fund and the remainder, or $12,960, from the General Fund. The total to date from the inception of the work in 1920, is $2,194,940 from the Construction Fund and $378,220 from the General Fund or a grand total of $2,573,161.

Structure work since 1922 in connection with drainage includes the following:

Description	Constructed	Average Cost Estimated	Average Cost Actual
Four Ton Bridges	152	$ 825.89	$ 564.91
Eight Ton Bridges	131	971.13	743.38
Twelve Ton Bridges	7	1,406.57	1,193.05
No. 72 Flumes	142	832.35	741.08
No. 84 Flumes	10	999.30	754.19
No. 96 Flumes	13	1,012.71	948.61
No. 108 Flumes	51	1,011.53	1,075.75
No. 120 Flumes	43	1,074.40	1,146.12
No. 132 Flumes	8	1,265.94	1,109.03
No. 144 Flumes	1	1,257.00	923.37
Corrugated Pipe Flumes	13	1,309.23	1,217.36

The following tabulation gives the total cost, for the years shown, of the average costs of one each of the following: four ton bridge, eight ton bridge, No. 72 flume, No. 108 flume, and No. 120 flume.

1924	$4,684.59
1925	3,908.73
1926	3,449.60
1927	3,324.47
1928	3,205.06

The Imperial Wheel Dredge was used almost continuously throughout the year in constructing individual drains, the cost of excavation being paid by the water users. The results obtained are highly satisfactory and it is planned to construct several more of these machines, which will be capable of excavating to a depth of eight feet.

A number of tabulations in connection with drainage construction are shown on pages 42 to 44 inclusive.

DRAINAGE INVESTIGATIONS:

Investigation of ground water conditions and the locating of new drains were continued throughout the year. All test wells were read regularly and showed that for the Valley as a whole, the drainage system is functioning satisfactorily. With the success of the wheel dredge assured, there has been a marked increase in the requests for surveys to locate short drains and it is anticipated that water users will construct many miles during the coming year.

As the benefits from drainage have become better known there has been a marked change in the attitude of the water users and as a result, together with the low cost of installing drains with the wheel dredge, it is believed the drainage question has been solved and the District is now in a position to meet any situation which may arise in the future.

MAINTENANCE OF DRAINS:

The following figures show the expenditures for the maintenance of drainage canals, structures, and pumps for the years 1927 and 1928:

	Canals	Structures	Pumping	Total
1927	$63,317	$17,227	$3,402	$83,946
1928	52,145	22,935	2,786	77,866

Of the above expenditures for the year 1928, the sum of $14,213 was made necessary by the break in the East Highline on July 14th. Although this break caused considerable damage to a number of drains, had it not been for the efficient manner in which the drainage system functioned in carrying off the flood waters, crop damage would have been many times as great as it was.

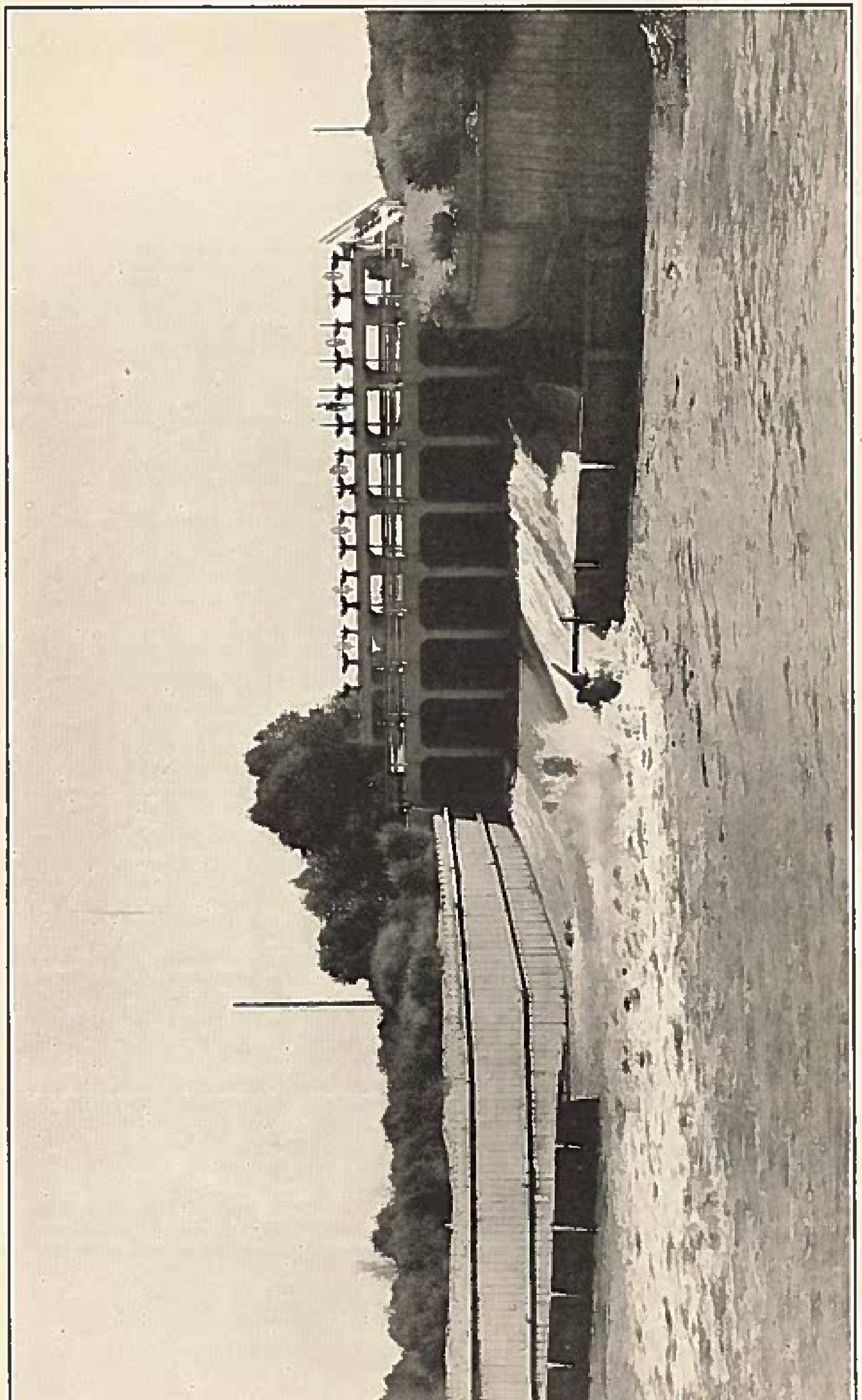
Main drains cleaned by dredging were as follows: Holtville Main, 4.1 miles; Holtville No. 2, 0.5 miles; Holtville 2D, 0.5 miles; Holtville 2C, 0.3 miles; Central Main, 12 miles; and Mt. Signal Main and No. 1, 7.1 miles, or a total of 24.5 miles. In addition, hand labor was utilized in maintaining about 55 miles, the work consisting of channelizing, cutting tules, and removing small dam obstructions.

As a result of continued sloughing of the Holtville Main Drain it was necessary to replace the Occident Flume and the Sunset Road Bridge, the two replacements costing some $8,000. The new bridge is a 165 foot structure while the length of the flume is 120 feet, both of heavy construction.

ALAMO AND NEW RIVERS:

The new channels constructed last year for the Alamo and New River Outlets to Salton Sea were in use this year. However, the New River Outlet silted in quite rapidly making it necessary to dredge the old channel to put it in condition. This work was started in October and completed in December and the water rediverted at that time. It is expected that the present channel of the Alamo River Outlet will serve until sometime in the year 1930 when it will be necessary to again divert the flow into the old channel. By providing two channels for each of the rivers, which can be used alternately, it is believed that a solution has been found for the outlet problem.

As in the past, considerable bank protection work was necessary this year throughout the length of both the New and Alamo Rivers, Kellner jetties and brush being used for riprap. A sharp bend on the Alamo River



ALAMO DAM—NEAR CALIPATRIA

immediately below the Brawley-Calipatria Highway was eliminated by dredging a cut-off some three hundred feet in length, through which the river was diverted.

POWER DEVELOPMENT:

After holding a number of hearings and considering reports from a number of engineers, the California Bond Certification Commission gave unanimous approval in September to the plans of the District for the development and distribution of hydro-electric power in Imperial Valley.

Under the proposed plans five hydro-electric plants are to be constructed on the present canal system, supplemented by a reserve plant at Imperial. Distribution will be made through a loop system of transmission lines in the Valley, including a line to Andrade to serve the needs of the District at that point, and local systems in the various towns. This development will constitute the first step in providing cheap power for Imperial Valley and will serve as a foundation from which expansion can follow as rapidly as justified. It will also place the District in the most advantageous position to best utilize the power to be developed on the All-American Canal; the construction of the latter was assured by the passage of the Swing-Johnson Bill and makes it more desirable than ever to proceed with development of power on the present canal system.

Now that the approval of the Bond Commission has been obtained, the next step will be to submit the plans to the people for their decision which will be expressed at an election to be called.

Meteorological Data:

The District, acting as an observer for the Weather Bureau of the United States Department of Agriculture, makes daily observations covering temperature—maximum and minimum—precipitation, direction of prevailing winds, character of the day, and other general observations regarding unusual occurrences, such as storms and earthquakes.

The maximum temperature for the year was 114 degrees on July 24th, the minimum, 29 degrees on January 18th and December 17th and 21st, and the mean was 72 degrees. The average monthly maximum temperature for the year was 89.1 while that for the minimum was 54.9.

During the year there were 318 clear days, 32 partly cloudy and 16 cloudy days. There was a precipitation of over .01 of an inch on 3 days only, and the total rainfall for the year amounted to .28 of an inch as compared to the normal of 3.29 for the past 15 years. There were no hard rain storms during the year.

A tabulation giving meteorological data for the year will be found on page 50.

Mechanical Department:

The District maintains two large modern and well equipped machine shops, one at Imperial and the other at Andrade. An auto shop is also maintained at Imperial to maintain the fleet of 116 autos and trucks which are in constant service.

The Imperial Shops maintain the following as well as other equipment: 7 Bucyrus, 7 Marion, 2 Stockton, 2 Monighan, 1 Buckeye wheel type, 1 Imperial Gas-Electric, 1 Imperial wheel type, 35 Ruth dredges and 1 Browning Truck crane. The shop equipment consists in part of the following: 1 five ton traveling crane, 6 lathes from 12 to 54 inches, 1 Universal iron worker, 1 Landis bolt threader, 2 Bender power hammers, 1 Lucas boring and milling machine, 1 Kempsmith milling machine, 1 Smith and Mills shaper, 1 Baker Brothers keyseater, 5 drill presses, 1 hydraulic press, 1 Osterlein tool and cutter grinder, 1 Lincoln arc welder, and 1 acetylene gas generating plant.

The Andrade Shop has to do primarily with the maintenance of two locomotives, 50 dump cars, 2 locomotive cranes, 2 suction dredges, 2 steam shovels and miscellaneous quarry equipment. The shop equipment, in part is as follows: 1 five ton traveling crane, 1 Cincinnati drill press, 1 Lodge and Shipley lathe, 1 Gould and Eberhard shaper, 1-36" and 1-21" Cincinnati drill press, 1 power band saw, 1 Landis bolt threader, 1 Leyner drill sharpener, 1 Sullivan air compressor, 1-600 pound Massilon steam hammer, and 1 Westinghouse arc welder.

The experience of the past years has fully demonstrated that the use of manganese steel for large gear castings, required on the various drag lines, prolongs the life of the castings five times that of ordinary years. Rough castings are also secured and finished in the District shops at a considerable saving over the finished product purchased in the open market.

During the year, a heat treating plant with necessary testing equipment was installed which permits the treating of alloy steel castings and shafts, the use of which has been found to reduce breakage, thereby increasing the efficiency of the machines and lowering maintenance cost.

The wheel type dredge developed by the District in cooperation with Mr. A. C. Clark and improved by the Buckeye Traction Ditcher Company has proved so successful that plans were prepared this year for the construction of a similar machine having a sixteen foot wheel, which will excavate drains to a depth of eight feet, as compared to the six foot depth limit of the present machine. Construction at the District shops was started in the latter part of the year and the machine will be available for work sometime during the spring of 1929.

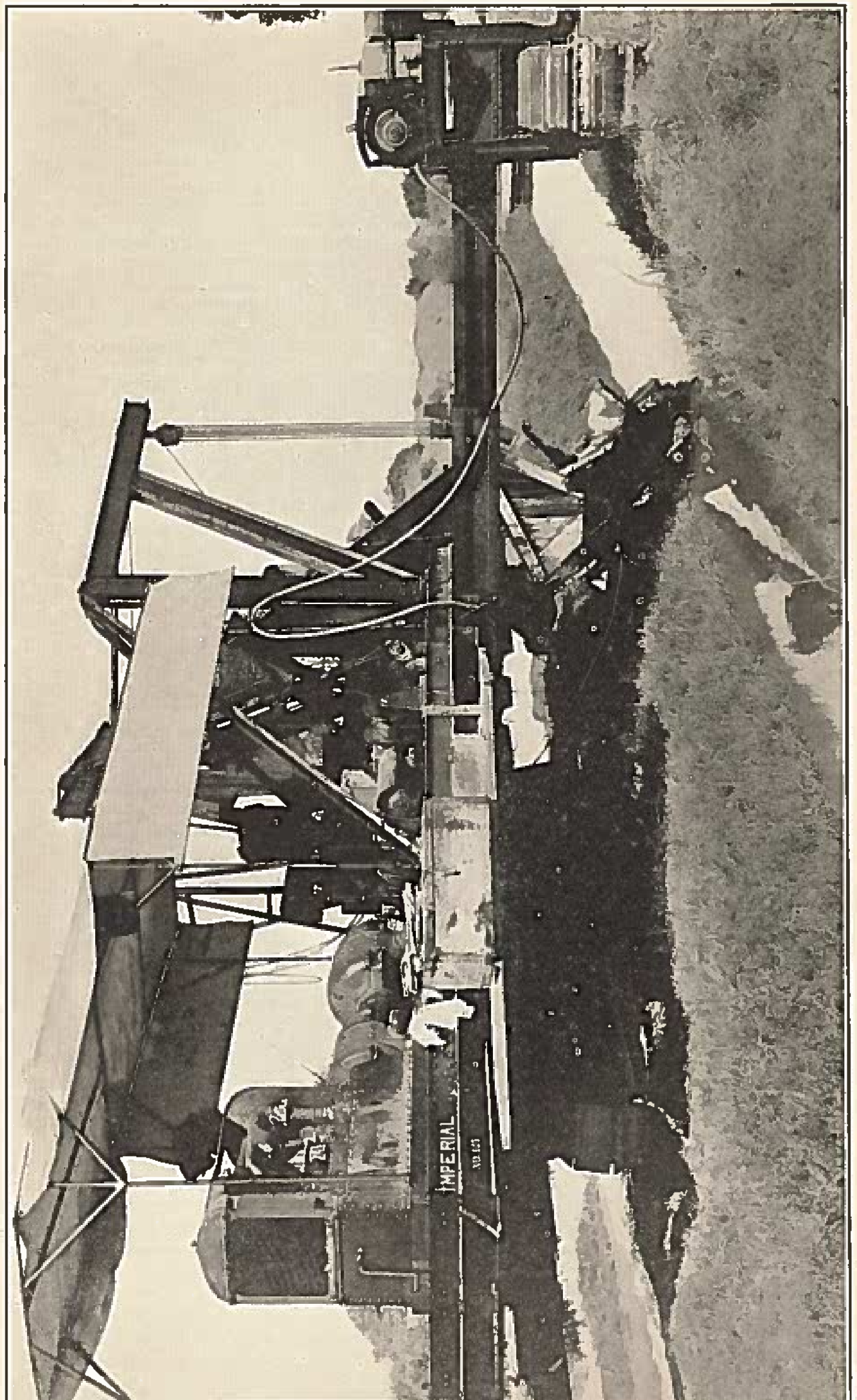
The design of a gas-electric bucket line excavator for maintaining canals was completed and one machine of this type constructed in the District shops this year. It has been in use since the middle of September and during one period of fourteen days averaged one mile of cleaning per day, which is considerably more than has been possible with other equipment. The advantage of the gas-electric type lies not only in increased speed but also in flexibility of handling and in lower maintenance costs. At least one and probably several more of these machines will be constructed next year.

Purchasing and Stores:

The purchasing of all material and supplies for the District is centralized in the Purchasing Department located at the Imperial Headquarters. By this method it is possible to purchase in large quantities at reduced unit prices and through the use of a perpetual inventory card system keep a close check of stocks on hand and maintain a balanced supply of material, which would otherwise be very difficult to accomplish.

For convenience and for the economical handling of materials the following nine warehouses are maintained: Imperial General Warehouse, Imperial Shop Storehouse, Andrade, Mexicali, Holtville, Brawley, Calipatria, Calexico, and Volcano Junction.

Material and equipment of all kinds purchased during the year amounted to approximately $450,000. The following tabulation gives an approximate recapitulation of purchases of a few of the larger items during the year.



GAS-ELECTRIC DREDGE—DESIGNED AND BUILT BY THE DISTRICT

Comparative Recapitulation of Purchases

Lumber and Cement	$ 84,560
Gasoline, Oil and Grease	77,592
Light, Power and Heat	45,419
Automobiles, Parts and Repairs	34,801
Hardware	30,975
Commissary Supplies	28,907
Culverts, Pipe and Hose	27,721
Dredges and Tractors (Parts and Repairs)	27,003
Office Supplies and Printing	23,870
Hay and Feed	19,135
Metal Castings	17,565
Steel, Iron and Bronze	14,903
Electrical Supplies	10,971
Rope and Cable	7,341
Sacks	5,799
Machinery Parts and Repairs	5,258
Engineering Equipment and Supplies	2,656
	$ 404,476

During the year there was manufactured at the Andrade ice plant for use of the River Division a total of 171,600 pounds of ice, making a grand total manufactured since the installation of the plant of 1,652,800 pounds.

There were 80,564 meals served during the year by the commissary departments in connection with operations over the entire system.

Real Estate and Buildings:

The following tabulations show buildings and lands owned by the District together with their book value as of December 31st, 1928.

BUILDINGS OWNED BY DISTRICT

Location	Description	Book Value December 31st, 1928	
Imperial	General Administration Office Building	$49,199	
	Main Shop Building	28,427	
	Auto Shop and Service Station	10,204	
	Office Building, Imperial Division	8,278	
	Sand Bunker	5,611	
	Main Storehouse	4,939	
	Rating Flume	4,812	
	Woodworking Shop	4,135	
	Industrial Fence	3,020	
	Washroom and Toilets	2,269	
	Storage Building for Records	1,088	
	6 Small Buildings	1,447	$123,429
Andrade	Mess House	$24,476	
	Machine Shop	11,290	
	Office Building	5,250	
	Superintendent's House	3,500	
	Warehouse	2,522	
	15 Employees' Residences	21,877	
	75 Small Buildings	8,845	77,760
Brawley	Store and Office Building	$12,517	
	6 Small Buildings	2,678	15,195
Calexico	Office Building	$ 4,900	
	Residence	3,415	
	Warehouse	2,100	
	6 Small Buildings	1,089	$ 11,504
	Forward		$227,888

	Brought Forward		$227,888
Calipatria	Bunkhouse	$ 2,491	
	Messhouse	1,750	
	Office Building	1,632	
	21 Small Buildings	5,124	10,997
Holtville	Office Building (Water Co. No. 7)	$ 3,882	
	Office Building (Water Co. No. 5)	3,110	
	3 Small Buildings and Yard Fence	3,394	10,386
U. S. Valley	69 Zanjero and Hydrographers' Houses	$32,705	
	19 Other Small Buildings	6,893	39,598
Mexico	Office Building	$ 2,800	
	Warehouse	2,561	
	16 Zanjero and Hydrographers' Houses	6,550	
	18 Other Small Buildings	5,065	16,976
	Total of 281 Buildings		$305,845

Land Owned by District on December 31st, 1928

Within Cities:		
Calexico—Block 71 and parts of Blocks 68 and 72		$ 31,723
Imperial—Blocks 4, 5, 19, 26, 27, 40, 41, 48, 49, 62 and parts of Block 18 (land used for administration buildings, shops and yards)	$13,198	
Improvements to land, Imperial Yards, and Grounds	15,420	
Lot 11, Block 82 and Lot 11, Block 83	1,689	
Block 89, S. E. of S. P. Station	150	30,457
Holtville—Part of Block 30		9,280
Mexicali—Part of Block 4		8,500
Brawley—5 acres in Block 27, Subdivision No. 1	$ 1,000	
Lot 15, Block 71	5,865	6,865
Calipatria—Parts of Blocks 22 and 34		2,412
Sub-total		$ 89,237
Outside Cities:		
127.2 Acres—Cartwright Ranch, in Sections 1, 2, 11 and 12, T. 16 S., R. 16 E.		8,800
516.9 Acres, at Andrade, in Sections 25, 26, 35, and 36 of T. 16 S., R. 13 E.	$ 5,169	
Improvements to land at Andrade	1,500	6,669
132 Acres in Sections 20 and 29, T. 12 S., R. 14 E.		4,200
10 Acres at Alamorio (Lot 1), in Sec. 31, T. 13S., R. 15 E.		1,930
120 Acres in Tract 180, T. 13 S., R. 14 E.		1,500
2 Acres in Tract 64, T. 13 S., R. 13 E.		579
1 Acre in Section 15, T. 12 S., R. 13 E.		500
2 Acres on Fern Canal, in Tract 212, T. 15 S., R. 12 E., and in Section 9, T. 16 S., R. 12 E.		482
Part of Tract 127, T. 14 S., R. 14 E.		400
3 Acres in Lot 1, Sec. 14 and Lot 6, Sec. 11, T. 16 S., R. 15 E. on Ash Canal		366
2 Acres in Tract 122, T. 14 S., R. 15 E.		359
8 Acres on Tamarack Canal, in Section 11, T. 14 S., R. 13 E		193
1 Acre in Tract 57, T. 15 S., R. 16 E.		95
Total Value of Land December 31st, 1928		$115,310

Besides the above, the District owns various unappraised parcels of land obtained for drainage and canal rights-of-way and for locations of dams, headings, etc., the largest of these parcels being one of about 200 acres in Section 36, T. 16 S., R. 13 E., at Dahlia Heading, and another irregularly shaped parcel of land within which is located the Rositas Dam, By-Pass and Wasteway in Sections 28, and 29, T. 15 S., R. 15 E. The District also owns all of Block 124, except the east 340 feet, townsite of Heber, on the Dogwood Canal.

Payments for Gopher and Muskrat Bounty:

By agreement with the County of Imperial, the District commenced payments in July, 1925, of fifty per cent of bounties paid by the County on gophers and all of the bounties on muskrats; the bounty on gophers being 10c each and that on muskrats 12½c. Under this agreement the District paid to the County a total of $35,399.62 for gopher bounty, or one-half the bounty on 707,992 gophers killed during the period July, 1925, to February, 1927, inclusive. During the same period the District reimbursed the County for all the bounty on 12,387 muskrats, or a total of $1,548.43.

In February, 1927, gopher bounty payments were discontinued entirely, and the District commenced paying directly to the trappers a bounty of 25c. for each muskrat tail presented. During 1927 the District paid a total of $5,560.25 as bounty on 22,241 muskrats, and during 1928 a total of $9,005.00 on 36,020 muskrats.

Summing up, from July, 1925, to December, 1928, inclusive, 707,992 gophers and 70,648 muskrats were exterminated at a total cost of $86,912.93 to the County and District jointly, of which the District paid $51,513.50 and the County $35,399,63.

Budget Estimates and Expenditures:

Total expenditures for the year amounted to $3,081,746 or $73,846 (2.45%) in excess of the budget estimate of $3,007,900. Operation and maintenance costs totaled $1,616,412 which is $107,282 less than for the previous year, in fact it is the lowest for a number of years.

The following tabulation gives a comparison of actual expenditures and budget estimates:

COMPARISON OF BUDGET ESTIMATE WITH ACTUAL EXPENDITURES, 1928

	Budget Estimate	Actual Expense	Under Budget	Over Budget
1. Board	$ 91,000	$ 97,461		$ 6,461
2. General Administration	87,000	90,837		3,837
3. Storage	10,000	86,747		76,747
4. Diversion	240,000	235,100	$ 4,900	
5. Water Distribution:				
Mexico Division	$ 179,500	$ 177,601		
General Water Office	37,000	35,061		
Holtville Division	272,000	275,365		
Imperial Division	231,500	238,349		
Brawley Division	224,000	225,093		
Calipatria Division	147,500	139,565		
Calexico Division	86,000	87,293		
	$1,177,500	$1,178,327		827
6. River Protection	$ 124,400	$ 76,431	47,969	
Forward	$1,729,900	$1,764,903	$52,869	$87,872

Brought Forward	$1,729,900	$1,764,903	$52,869	$87,872
7. Real Estate, Etc.:				
Tel. and Power Lines	$ 27,500	$ 27,197		
Real Estate and Bldgs.	20,500	24,158		
Auto Vehicles	8,000	6,988		
Misc. New Equipment	52,500	49,345		
	$ 108,500	$ 107,688	812	
8. Bond and Other Indebtedness	$1,067,500	$1,087,557		20,057
9. Drainage and Miscellaneous:				
Drainage Maintenance	$ 73,000	$ 77,866		
Drainage Construction	10,000	12,960		
Alamo and New Rivers	19,000	30,772		
	$ 102,000	$ 121,598		19,598
Total	$3,007,900	$3,081,746	$53,681	$127,527

Valuations and Assessments:

During the year the net assessed valuation was decreased by $117,773. Payments required to meet matured bond interest, bond redemptions and amounts due on Laguna Dam contract, have steadily increased until the year 1928, when the amount of these fixed charges decreased by $11,000, due to a reduction of bond interest. The bond interest for the year 1929 will be $12,375 less than for the year 1928, but bond redemptions will be $50,000 more, making a net increase of $37,625 in the amount of fixed charges for the year 1929 over those for the year 1928.

Year	*Net Assessed Valuation	Per Cent. of 1920-21	Fixed Charges	Per Cent. of 1920-21	Rate Required
1920-21	$45,555,551	100.0	$ 469,500	100.0	1.03
1921-22	40,983,642	89.9	694,500	147.9	1.69
1922-23	39,413,783	86.5	951,500	202.7	2.41
1923-24	36,573,181	80.3	951,500	202.7	2.60
1924-25	36,050,103	79.1	1,080,750	230.2	3.00
1925-26	40,393,572	88.7	1,123,875	239.4	2.78
1926-27	41,563,353	91.2	1,164,250	248.0	2.80
1927-28	41,141,887	90.3	1,153,250	245.6	2.80
1928-29	41,024,114	90.1	1,190,875	253.6	2.90

*15% less than the total assessed valuation set up on books of Assessor and Collector.

Land Assessments paid before issuance of Certificates of Sale, for the above years are as follows:

Year	Assessed Valuation	Rate	Total of Assessments	Paid	Per Cent.
1920-21	$53,594,766	.025	$1,339,869	$1,074,167	80.2
1921-22	48,216,049	.011	530,376	446,895	84.3
1922-23	46,369,156	.025	1,159,229	1,003,769	86.6
1923-24	43,027,272	.050	2,151,364	1,913,928	89.0
1924-25	42,411,886	.050	2,120,594	1,824,825	86.1
1925-26	47,521,849	.050	2,376,092	2,076,669	87.4
1926-27	48,898,062	.050	2,444,903	2,061,477	84.3
1927-28	48,402,220	.050	2,420,111	2,039,368	84.3
1928-29	48,263,664	.050	2,413,183	* 999,285	41.4

* To December 31st, 1928.

The following statement shows the portion of each year's assessment transferred to certificates of sale, the percentage of this portion to the total assessment, the amount of certificates of sale for each year unpaid on December 31st, 1928, and the percentage of these unpaid certificates of sale to the total assessment.

Year of Assessment Levy	Portion of Assessment Transferred to Certificates of Sale	Per Cent of Total Assessment	Certificates of Sale Unpaid, December 31, 1928	Per Cent. of Total Ass't
1920-21	$ 260,698*	19.5	$ 42,648	3.18
1921-22	83,479	15.7	18,107	3.41
1922-23	155,461	13.4	40,561	3.50
1923-24	244,706	11.3	79,640	3.70
1924-25	293,623	13.8	113,296	5.34
1925-26	298,500	12.6	162,811	6.85
1926-27	381,216	15.6	239,924	9.81
1927-28	377,752	15.6	352,771	14.62
Total	$2,095,435		$1,049,758	

* Approximate for 1920-21.

Comparison of Asset and Expense Expenditures and Income:

The following table gives a comparison of expenditures by asset and expense accounts, exclusive of those in connection with absorption of Mutual Water Companies and Drainage Construction from funds derived from the sale of bonds. The asset accounts include only new construction and equipment, and betterments; expense accounts include operation, maintenance of canals, maintenance of structures, etc.

	Asset Expenditures		Bonded Indebtedness and Expense		
Year	Laguna Dam	Other	Bond Interest and Principal	Other	Totals
1921	$32,000	$577,654	$ 434,411	$ 934,393	$1,978,458
1922	32,000	653,499	408,555	898,796	1,992,850
1923	64,000	721,480	724,165	1,634,989	3,144,634
1924	64,000	429,157	794,977	1,632,321	2,920,455
1925	96,000	365,565	961,850	1,772,730	3,196,145
1926	96,000	224,418	1,068,645	1,783,786	3,172,849
1927	96,000	266,181	1,077,717	1,720,643	3,160,541
1928	96,000	281,777	1,059,982	1,643,987	3,081,746

The revenue from water sales and service charges, together with amounts realized from redemption of Certificates of Sale, was as follows:

	Water Sales and Service Charges		Redemption of Certificates	
Year	Mexico	United States	(Including Interest)	Total
1921	$334,938	$ 765,464	$ 75,125	$1,175,527
1922	469,741	788,952	168,887	1,427,580
1923	526,972	* 918,370	176,707	1,622,049
1924	532,418	* 295,698	178,344	1,006,460
1925	630,259	* 253,593	258,704	1,142,556
1926	585,156	82,955	219,774	887,885
1927	496,017	82,308	211,564	789,889
1928	615,785	83,575	303,852	1,003,212

* The gross revenue from water sales in the United States for these three years was as follows: for the year 1923, $920,047; for the year 1924, $1,039,658; and for the year 1925, $1,019,248. The net revenue was as shown in the above tabulation, after applying assessment credits in the following amounts: on 1923 water sales, $1,677, on 1924 water sales, $743,960; and on 1925 water sales, $765,655.

Changes in Method of Collection for Water:

In establishing the rate for the 1923-24 levy and water tolls, a change was made from the previous practice in that, whereas the toll charges remained the same, $1.00 per acre foot, the assessment rate was increased from $2.50 to $5.00 per hundred dollar valuation, and an assessment credit was allowed to apply on water used to equal one-half of the assessment paid on land assessed on an acreage basis, for water delivered after payment of the assessment. This was later changed so that credits would apply to water used in 1924 previous to date of payment provided payment was made on or before December 31st, 1924. In 1925 this was again changed so that credits would apply on water used at any time during the year irrespective of the dates upon which payments of assessments were made. In 1924 the District also collected from tenants for water used, and refunded to owners up to but not exceeding the amount of the assessment credit, but in 1925 no collections were made from tenants for water used until the assessment credit had been entirely exhausted.

Effective January 1st, 1926, land assessed on an acreage basis was allowed all water required without charge, except for a service charge of 25 cents per gate per day for each and every day water was delivered. For lands within incorporated cities and towns, the charge remained at $1.00 per acre foot but without the service charge.

Financial and Cost Statements and Tabulations:

I herewith submit the several Financial and Cost Statements for the year 1928, together with additional statements and tabulations concerning the current year's operations. They are more particularly enumerated as follows:

1. Financial Statement.
2. Statement of Accrued Income and Expense.
3. Adjustments to Surplus Account.
4. Statement of Cash Receipts and Disbursements.
5. Statement of Cash Receipts by the Collector.
6. Expenditures for Calendar Years 1925 to 1928, inclusive.
7. Drainage Tabulations.
8. River Discharge and Diversion at Hanlon.
9. Bond Issues, Principal and Interest.
10. Crop Report.
11. Water, Weather, and Crop Report.
12. Meteorological Data.
13. Graph showing Bond and Laguna Dam Payments.
14. Graph showing Expenditures.
15. Salton Sea Elevations.
16. Affidavit of Business Manager.

Financial Statement

December 31st, 1928

BALANCE SHEET

ASSETS

CURRENT ASSETS:		
Cash	$ 926,091.83	
Materials and Supplies	280,177.02	
Accounts Receivable	2,813,143.81	
Land Held under District Tax Deeds	2,211.96	
Total Current Assets		$ 4,021,624.62
CAPITAL ASSETS:		
Canal System, Additions and Betterments	$10,546,191.59	
Protective Works	3,062,469.68	
Drainage System—Canals and Structures	2,667,402.07	
Land	115,310.21	
Buildings	305,844.50	
Equipment and Facilities	1,066,647.31	
Other Capital Assets	10,890.00	
Total Capital Assets		17,774,755.36
DEFERRED ASSETS AND CHARGES:		
Laguna Dam Diversion Right	$ 1,600,000.00	
Funds Advanced for Litigation, Etc.	9,523.06	
Prepaid Expenses	34,045.13	
Other Deferred Assets and Charges	72,946.37	
Total Deferred Assets and Charges		1,716,514.56
Total Assets		$23,512,894.54

LIABILITIES AND SURPLUS

CURRENT LIABILITIES:		
Unpaid Warrants	$ 323,105.38	
Unpaid Matured Bond Interest	433,367.50	
Third Issue Bonds Maturing July 1st, 1929	250,000.00	
Other Accounts Payable	115,223.55	
Total Current Liabilities		$ 1,121,696.43
BONDED INDEBTEDNESS:		15,100,000.00
DEFERRED LIABILITIES AND CREDITS:		
Laguna Dam Diversion Right Contract	$ 960,000.00	
1927 Assessments for Budget Year 1928	2,412,311.25	
Other Deferred Liabilities and Credits	12,522.52	
Total Deferred Liabilities and Credits		3,384,833.77
SURPLUS:		
Surplus of Prior Years	$ 3,280,575.41	
Surplus of Year 1928	625,788.93	
Total Surplus		3,906,364.34
Total Liabilities and Surplus		$23,512,894.54

DETAIL OF FINANCIAL STATEMENT

ASSETS

I—CASH:

Cash with District Treasurer:			
General Fund ....$	40.33		
Construction Fund	77,564.22		
Bond Fund	243,102.17		
Compania Fund	24,055.44		
Compania Special Tax Fund	22,205.50	$ 366,967.66	
Cash with Assessor and Collector		547,906.26	
Cashier Account Revolving Fund		5,335.58	
Petty Cash Funds		1,690.00	
Cash in Transit to Treasurer..		4,192.33	
Total Cash			$ 926,091.83

II—MATERIALS AND SUPPLIES:

Value of Stores on Hand:			
Mercantile Store, Andrade....$	2,553.65		
Mess Houses	289.14	$ 2,842.79	
Value of Stores, Storehouses and Material Yards:			
Andrade ....$	77,658.22		
Brawley	2,207.45		
Calexico	1,402.22		
Calipatria	3,643.08		
Holtville	1,922.24		
Imperial	44,665.95		
Imperial Shop Stores	115,434.33		
Mexicali	16,823.60		
Volcano Junction	854.92	264,252.01	
Quarried Rock, Andrade		11,712.70	
Materials and Supplies in Process		613.54	
Materials and Supplies in Transit to Jobs		404.61	
Materials and Supplies in Transit to Stores		341.90	
Mexican Revenue Stamps		9.47	
Total Materials and Supplies			280,177.02

III—ACCOUNTS RECEIVABLE:

Assessor and Collector—1928-1929 Assessments		$ 1,413,025.81	
Certificates of Sale — Delinquent Assessments ....$	1,093,106.09		
Less Reserve for Cancellations	218,621.22	874,484.87	
Accrued Interest Receivable on Certificates of Sale ....$	597,759.62		
Less Reserve for Cancellations	119,551.92	478,207.70	
Uncollected Water Sales and Service Charges, United States		20,100.69	
Miscellaneous Accounts Receivable		24,382.61	
Accrued Interest Receivable on Bank Deposits		2,535.48	
Notes Receivable		406.65	
Total Accounts Receivable			$2,813,143.81
Land Held Under Tax Deeds..			2,211.96

IV—DEFERRED ASSETS AND CHARGES:

Laguna Dam Diversion Right..		$ 1,600,000.00	
Funds Advanced:			
For Litigation ....$	8,815.56		
For Special Investigations, etc.	707.50	9,523.06	
Doubtful Accounts Receivable		64,605.26	
Funds with Liquidator — Farmers and Merchants Bank		8,201.04	
Claims on Other Banks Account Failure Farmers and Merchants Bank		140.07	
Prepaid Insurance		12,378.32	
Prepaid Corral Expense		7,341.31	
Other Prepaid Expenses		14,325.50	
Total Deferred Assets and Charges			1,716,514.56

V—FIXED ASSETS:

Construction Costs Incurred to December 31st, 1928:				
Canal System, Additions and Betterments		$10,546,191.59		
Protective Works		3,062,469.68		
Drainage Canals & Structures		2,667,402.07		
Buildings	$400,515.37			
Less Reserve for Depreciation	94,670.87	305,844.50		
Land		115,310.21		
Total Construction Costs				$16,697,218.05
Equipment and Facilities:				
Excavating Machinery and Field Equipment		$ 1,508,906.36		
Less Reserve for Depreciation		857,679.59	$651,226.77	
Unpaid State Compensation Insurance			5,333.19	
Rolling Stock		$ 223,473.95		
Less Reserve for Depreciation		66,363.54	157,110.41	
Telephone and Power Lines		$ 106,825.43		
Less Reserve for Depreciation		9,702.42	97,123.01	
Shop Machinery		$ 77,007.53		
Less Reserve for Depreciation		24,732.09	52,275.44	
Office Equipment		$ 48,587.92		
Less Reserve for Depreciation		10,574.31	38,013.61	
Automobiles and Trucks		$ 72,463.29		
Less Reserve for Depreciation		50,729.78	21,733.51	
Commissary Equipment		$ 38,226.43		
Less Reserve for Depreciation		22,193.14	16,033.29	
Live Stock			15,025.00	
Shop Tools			18,106.27	
Total Equipment and Facilities				1,066,647.31
Other Fixed Assets:				
Salton Sea Flooding Easements			$ 10,590.00	
Investments in Stock of Other Companies			300.00	10,890.00
Total Fixed Assets				$17,774,755.36
Grand Total Assets				$23,512,894.54

LIABILITIES AND SURPLUS

VI—ACCOUNTS PAYABLE:

Unpaid District Warrants	$ 374,921.16		
Less Warrants favor Compania and Revolving Funds held by Treasurer	51,815.78	$ 323,105.38	
Third Issue Bonds Maturing July 1st, 1929		250,000.00	
Unpaid Matured Bond Interest		433,367.50	
Unpaid Interest on District Warrants		983.58	
Unpaid District Time Vouchers		45,904.68	
Unpaid Compania Time Vouchers		5,558.35	
Unpaid Compania Vouchers		1,537.86	
Unpaid Revolving Fund Checks		4,705.32	
Unpaid Purchases		27,938.20	
Unpaid Mexican Federal Water Tax		22,689.97	
Unredeemed Mercantile Store Coupons		206.40	
Unpaid Miscellaneous		366.00	
Total Accounts Payable			$ 1,121,696.43

VII—DEFERRED LIABILITIES AND CREDITS:

Laguna Dam Diversion Right		$ 960,000.00	
Advance Deposits on Water Accounts, Mexico		10,679.52	
Deposits for Construction Work		745.00	
Guaranty Deposits on Water Accounts, U. S.		878.00	
Unapplied Cash Collections		220.00	
Total Deferred Liabilities and Credits			972,522.52

VIII—DEFERRED REVENUES:			
Assessments levied by District, Year 1928-29			$2,412,311.25
IX—BONDED INDEBTEDNESS:			
Imperial Irrigation District Bonds:			
First Issue 5%		$ 3,500,000.00	
Second Issue 5%		2,500,000.00	
Third Issue 5½%	$ 1,850,000.00		
Less Bonds Maturing July 1st, 1929	250,000.00	1,600,000.00	
Fourth Issue 6%		7,500,000.00	
Total Bonded Indebtedness			15,100,000.00
X—SURPLUS:			
Surplus of Prior Years		$ 3,280,575.41	
Surplus of Current Year		625,788.93	
Total Surplus			3,906,364.34
Grand Total Liabilities and Surplus			$23,512,894.54

INCOME AND EXPENSE STATEMENT FOR YEAR 1928.

INCOME:			
Assessments for Year 1928 (1927-28 Levy)			$ 2,345,544.97
Water Sales and Service Charges:			
Water Sales—Mexico		$ 615,784.72	
Water Sales—United States		14,523.10	
Service Charges — United States		69,051.89	
Total Water Sales and Service Charges			699,359.71
Total Operating Income			$ 3,044,904.68
Miscellaneous Income:			
Penalties and Costs on 1928 Assessments		$ 55,600.36	
Interest on Certificates of Sale		205,200.01	
Interest on Bank Deposits		6,572.38	
Rental of District Property		7,051.69	
Cash Discount on Purchases		4,121.46	
Gain on Exchange of Mexican Currency		3,009.19	
Unpayable Accounts		344.46	
Other Miscellaneous Revenue		24,422.80	
Total Miscellaneous Income			306,322.35
Total Income			$ 3,351,227.03
EXPENSES:			
Operation and Maintenance of System		$ 1,617,615.93	
Depreciation of Buildings, Equipment and Facilities		210,489.55	
Accrued Interest on District Bonds		857,250.00	
Total Operating Expenses		$ 2,685,355.48	
Miscellaneous Expenses:			
Interest on District Warrants	$ 27,192.44		
Adjustments of Inventories of Materials and Supplies	7,720.27		
Loss on Exchange	3,381.63		
Uncollectible Accounts	363.37		
Taxes	301.30		
Miscellaneous Losses	1,123.61		
Total Miscellaneous Expenses		40,082.62	
Total Expenses			2,725,438.10
Surplus of Income over Expenses for Year 1928			$ 625,788.93

ADJUSTMENTS TO SURPLUS ACCOUNTS

	Debit	Credit
Surplus, December 31st, 1927		$3,108,991.44
ADJUSTMENTS:		
Reserve for Cancellations of Certificates of Sale	$ 148,066.95	
Reserve for Cancellations of Interest on Certificates of Sale	82,661.68	
Cancellations of Certificates of Sale	14,186.32	
Loss on Obsolete and Abandoned Floating Dredge Marion 307 and Tender	26,206.99	
Obsolete Materials and Supplies	7,003.63	
Calipatria Quarry Expense, Years 1925 and 1926	5,297.77	
Adjustment of Corral Expense Clearing Account	3,805.26	
Expense for Concrete Piers and Falsework under S. P. tracks at Bernice, Year 1927	1,617.46	
Miscellaneous Debit Adjustments	8,409.75	
Interest on Certificates of Sale, accrued prior to 1928		413,308.43
Colorado River Land Company's share of Protective Work on Pescadero Levee, Years 1926 and 1927		43,247.04
State Compensation Insurance Dividend for Year 1927		5,581.03
Interest on Bank Deposits for Year 1927		1,638.42
Miscellaneous Credit Adjustments		5,064.86
Excess of Income over Expense for Year 1928, as per Income and Expense Statement		625,788.93
Surplus, December 31st, 1928	3,906,364.34	
Totals	$4,203,620.15	$4,203,620.15

Statement of Cash Receipts and Disbursements by Funds

GENERAL FUND

Balance on Hand January 1st, 1928		$ 2,853.40
RECEIPTS:		
From Assessor and Collector as per schedule	$ 1,342,566.81	
Collections from Water Sales and Service Charges, United States	84,697.37	
From City of El Centro for removal of Date Canal	30,000.00	
For dredging and shoveling private drains and ditches	8,803.50	
Sales of Tax Deeds to Land	8,535.73	
From Delta Canal Company for raising levee for siphons	7,196.27	
Andrade Mercantile Store sales	6,777.70	
Repairs or construction of bridges	6,150.73	
For delivery gates, checks and waste boxes	6,123.82	
For drainage pipes and installation	5,904.08	
Rental of buildings and property	5,665.30	
Refunds of cash advances	5,611.18	
State Compensation Insurance dividend	5,581.03	
Refunds by State of California of gasoline tax	4,861.83	
Deposit by Balfour-Guthrie Company for dredging drain	4,087.50	
For siphons and flumes	2,687.57	
Miscellaneous materials and supplies sold	2,125.97	
From California State Highway Commission for extending Eucalyptus Lateral No. 4	2,000.00	
From Insurance Companies for Fire Losses	1,938.44	
Sales of old equipment and scrap	1,869.00	
Treasurer's Collections from Assignments of Certificates of Sale	1,534.60	
Dividends from Receiver of Farmers and Merchants Bank of Imperial	1,471.96	
From Colorado River Land Company for Rental of Power Line	1,000.00	
From County of Imperial for gopher bounty	967.31	
Treasurer's Collections of Interest on Certificates of Sale	962.22	
Shop repair work for others	893.82	
Freight refunds	845.85	
Payments for personal telephone calls	703.69	
For repairs to telephone lines of others	667.41	
From R. H. Delno for excavating tank	650.00	
For pumping water from fields	525.57	
From State Highway Commission for half of cost of Acacia Surface Drain	443.02	
Sales of maps and blue prints	88.10	
Refunds of insurance premiums	73.02	
Other miscellaneous receipts	5,472.49	
Total Receipts		1,559,482.89
Forward		$1,562,336.29

Brought Forward			$ 1,562,336.29
Transfers From:			
Compania Fund		$ 416,223.01	
Bond Fund		121,742.71	
Construction Fund		71,115.02	609,080.74
Total			$ 2,171,417.03
DISBURSEMENTS:			
Audited Warrants	$ 626,880.61		
Interest on Registered Warrants	27,574.73	$ 654,455.34	
Transfers To:			
Compania Fund	$ 1,116,432.34		
Revolving Fund	239,394.15		
Bond Fund	161,094.87	1,516,921.36	2,171,376.70
Balance in General Fund December 31st, 1928			$ 40.33

CONSTRUCTION FUND

Balance on Hand January 1st, 1928	$ 148,679.24
RECEIPTS:	
None.	
DISBURSEMENTS:	
Transfers:	
To General Fund, covering construction of drainage canals and structures	71,115.02
Balance in Construction Fund, December 31st, 1928	$ 77,564.22

BOND FUND

Balance on Hand January 1st, 1928			$ 257,212.50
RECEIPTS:			
From Assessor and Collector as per Schedule		$ 1,006,520.01	
Transfers:			
From General Fund		161,094.87	1,167,614.88
			$ 1,424,827.38
DISBURSEMENTS:			
Matured Bond Interest Paid	$ 859,982.50		
Matured Bonds Paid	200,000.00	$ 1,059,982.50	
Transfers:			
To General Fund		121,742.71	1,181,725.21
Balance in Bond Fund December 31st, 1928			$ 243,102.17

CASHIER ACCOUNT REVOLVING FUND

Balance on Hand January 1st, 1928		$ 10,798.36
RECEIPTS:		
Transfers:		
From General Fund		239,394.15
		$ 250,192.51
DISBURSEMENTS:		
Audited Cashier Account Checks	$ 231,674.24	
Audited Andrade Drafts	13,182.69	244,856.93
Balance in Revolving Fund, December 31st, 1928		$ 5,335.58

COMPANIA FUND

Balance on Hand January 1st, 1928			$ 36,154.50
RECEIPTS:			
From Water Users, Mexico		$ 676,513.64	
Miscellaneous Accounts Receivable		2,780.36	
Interest on Bank Deposits		462.22	
		$ 679,756.22	
Transfers:			
From General Fund		1,116,432.34	1,796,188.56
Total			$ 1,832,343.06
DISBURSEMENTS:			
District Time Vouchers	$ 1,157,355.88		
Compania Time Vouchers	147,050.38		
Compania Vouchers	42,281.02	$ 1,346,687.28	
Loss on Exchange of Mexican Currency		3,258.63	
		$ 1,349,945.91	
Transfers To:			
General Fund	$ 416,223.01		
Compania Tax Fund	42,118.70	458,341.71	1,808,287.62
Balance in Compania Fund, December 31st, 1928			$ 24,055.44

COMPANIA TAX FUND

Balance on Hand, January 1st, 1928			$ 20,418.01
RECEIPTS:			
Transfers from Compania Fund			42,118.70
			$ 62,536.71
DISBURSEMENTS:			
Compania Vouchers in payment of Mexican Federal Water Tax for last half of 1927 and first half of 1928			40,331.21
Balance in Compania Tax Fund, December 31st, 1928			$ 22,205.50

CASH WITH ASSESSOR AND COLLECTOR

On hand Jan. 1st, 1928			$ 510,778.33
RECEIPTS:			
1927 Assessment Levy		$ 1,072,024.47	
1928 Assessment Levy		999,285.44	
Redemptions of Certificates of Sale:			
1912	$ 1.44		
1913	5.16		
1914	2.56		
1915	1.12		
1916	24.93		
1917	40.91		
1918	111.23		
1919	119.54		
1920	1,940.75		
1921	808.44		
1922	3,161.70		
1923	4,942.48		
1924	15,975.88		
1925	34,857.05		
1926	116,579.21		
1927	63,049.35	241,621.75	
1927 Certificates of Sale awarded others at annual sale of property Sept. 8, 1928		3,049.62	
Interest on Certificates of Sale Redeemed		56,683.59	
Penalties and Costs on 1927 Assessments		13,475.88	
Miscellaneous Fees		74.00	2,386,214.75
Total Receipts			$ 2,896,993.08
DEPOSITED WITH TREAS.:			
In General Fund		$ 1,342,566.81	
In Bond Fund		1,006,520.01	2,349,086.82
Cash Balance with Assessor and Collector on December 31st, 1928			$ 547,906.26

Expenditures for Calendar Years 1925 to 1928 Inclusive

No.	Feature Item	1925	1926	1927	1928
1.	**BOARD OF DIRECTORS:**				
	El Centro Office	$ 88,818.41	$ 93,140.39	$ 100,406.69	$ 97,461.41
2.	**GENERAL ADMINISTRATION:**				
	Headquarters Office	$ 96,693.39	$ 87,378.63	$ 88,922.17	$ 90,836.84
3.	**STORAGE:**				
	Boulder Canyon Dam	$ 26,310.66	$ 6,386.76	$ 67,148.03	$ 86,746.57
4.	**DIVERSION:**				
	Laguna Dam Contract		$ 192,000.00	$ 96,000.00	$ 96,000.00
	Diversion Gates	$ 21,365.08	20,624.18	24,653.96	25,099.56
	Intake Canal	834.61	2,471.17	2,669.51	2,996.06
	Diversion Weir	17,286.31	18,764.91	14,646.84	11,497.30
	Dredging	79,714.54	72,631.31	80,708.10	84,762.67
	Miscellaneous Operations	11,943.55	13,825.85	12,752.62	14,744.02
	Total	$ 131,144.09	$ 320,317.42	$ 231,431.03	$ 235,099.61
5.	**WATER DISTRIBUTION:**				
	Mexico:				
	Canal Operation	$ 64,197.79	$ 64,649.26	$ 62,411.20	$ 63,877.43
	Canal Maintenance	134,897.30	89,670.77	73,971.51	91,119.73
	Structure Maintenance	10,933.51	4,595.06	10,232.25	21,671.54
	Canal Construction				932.21
	Structure Construction		2,549.54		
	Total	$ 210,028.60	$ 161,464.63	$ 146,614.96	$ 177,600.91
	United States:				
	Canal Operation	$ 211,429.37	$ 197,207.38	$ 191,970.91	$ 197,083.72
	Canal Maintenance	684,328.94	675,335.85	637,375.36	606,319.91
	Structure Maintenance	101,071.06	118,851.19	145,034.49	129,496.95
	Canal Construction	4,908.39	11,722.17	10,313.24	22,786.89
	Structure Construction	90,451.81	31,118.76	33,425.49	45,039.57
	Total	$1,092,189.57	$1,034,235.35	$1,018,119.49	$1,000,727.04

No.	Feature Item	1925	1926	1927	1928
6.	RIVER PROTECTION:				
	Patrolling and Maintaining Levees	$ 14,962.66	$ 70,463.60	$ 77,145.32	$ 25,948.10
	Improvements to Levee System	66,747.40	42,452.32	48,001.51	50,482.53
	Total	$ 81,710.06	$ 112,915.92	$ 125,146.83	$ 76,430.63
7.	REAL ESTATE, BUILDINGS, ETC.:				
	Telephone and Power Lines, Operation and Maintenance	$ 23,329.49	$ 24,799.30	$ 26,238.70	$ 23,707.56
	Telephone and Power Lines, Construction	21,399.54	2,420.48	361.53	3,489.70
	Real Estate and Buildings, Maintenance	10,778.87	17,978.37	15,975.88	21,500.91
	Real Estate and Buildings, Construction	109,322.53	7,640.41	9,618.51	2,657.00
	Equipment, Renewals and Purchases	41,355.31	64,065.34	63,024.97	56,332.96
	Total	$206,185.74	$ 116,903.90	$ 115,219.59	$ 107,688.13
8.	BONDED INDEBTEDNESS:				
	Bond Interest	$863,850.00	$ 923,645.00	$ 875,717.50	$ 864,982.50
	Redemption of Bonds	98,000.00	145,000.00	202,000.00	195,000.00
	Interest on Registered Warrants	9,554.97	5,904.81	17,174.01	27,574.73
	Total	$971,404.97	$1,074,549.81	$1,094,891.51	$1,087,557.23
9.	DRAINAGE CONSTRUCTION, MAINTENANCE AND MISCELLANEOUS:				
	Drainage Construction, General Fund	$ 12,257.23	$ 55,363.76	$ 34,287.36	$ 12,959.53
	Drainage Maintenance	77,522.01	60,447.21	83,946.43	77,866.09
	New River Outlet	16,807.77	14,272.65	26,628.64	15,557.06
	New River Bank Protection	152.95	684.83	1,016.61	2,666.46
	Alamo River Outlet	1,083.85	517.70	12,179.70	6.61
	Alamo River Bank Protection	1,488.07	13,540.31	9,886.24	12,191.87
	Adjustment of Salton Sea Claims		116,031.22	4,795.46	350.00
	Miscellaneous	9,430.77	698.47		
	Total	$118,742.65	$ 261,556.15	$ 172,740.44	$ 121,597.62

Summary

		1925	1926	1927	1928
1.	Board of Directors	$ 88,818.41	$ 93,140.39	$ 100,406.69	$ 97,461.41
2.	General Administration	96,693.39	87,378.63	88,922.17	90,836.84
3.	Storage	26,310.66	6,386.76	67,148.03	86,746.57
4.	Diversion	131,144.09	320,317.42	231.431.03	235,099.61
5.	Water Distribution, Mexico	210,028.60	161,464.63	146,614.96	177,600.91
	Water Distribution, United States	1,092,189.57	1,034,235.35	1,018,119.49	1,000,727.04
6.	River Protection	81,710.06	112,915.92	125,146.83	76,430.63
7.	Real Estate, Buildings, Facilities, Etc.	206,185.74	116,903.90	115,219.59	107,688.13
8.	Bonded Indebtedness	971,404.97	1,074,549.81	1,094,791.51	1,087,557.23
9.	Drainage Construction and Miscellaneous	118,742.65	261,556.15	172,740.44	121,597.62
	Total Budget Expenditures	$3,023,228.14	$3,268,848.96	$3,160,540.74	$3,081,745.99
	Drainage Construction, Construction Fund	507,893.88	274,629.37	228,938.59	61,156.21
	Total, Including Expenditures from Construction Fund	$3,531,122.02	$3,543,478.33	$3,489,479.33	$3,142,902.20
	Capital Accounts	873,458.75	836,047.48	793,119.23	633,933.17
	Expense Accounts	2,657,663.27	2,707,430.85	2,596,360.10	2,508,969.03

Drainage

DRAINAGE CONSTRUCTION EXPENDITURES

GENERAL FUND

	1928 Miles	1928 Cost	Total Miles	Total Cost
East of Alamo	.55	$11,617.55	32.71	$ 228,311.92
Between Alamo and New Rivers			3.43	36,107.30
West of New River	.36	1,341.98	7.44	28,347.95
Engineering, Etc.				43,796.57
Alignment of Rivers				41,656.40
Totals	.91	$12,959.53	43.58	$ 378,220.14

CONSTRUCTION FUND

	1928 Miles	1928 Cost	Total Miles	Total Cost
East of Alamo	3.60	$38,139.61	54.10	$ 649,540.53
Between Alamo and New Rivers	.31	5,203.66	74.28	830,476.72
West of New River	.25	6,130.37	53.94	400,727.41
Engineering, Etc.	.	11,682.57		289,472.99
Alignment of Rivers				24,722.98
Purchase of Machinery				191,413.99
Totals	4.16	$61,156.21	182.32	$2,386,364.62

SUMMARY OF DRAINAGE EXPENDITURES

	1928 Miles	1928 Cost	Total Miles	Total Cost
East of Alamo	4.15	$49,757.16	86.81	$ 877,852.45
Between Alamo and New Rivers	.31	5,203.66	77.71	866,584.02
West of New River	.61	7,472.35	61.38	429,075.36
Engineering, Etc.		11,682.57		333,269.56
Alignment of Rivers				66,379.38
Purchase of Machinery				191,413.99
Totals	5.07	$74,115.74	225.90	$2,764,574.76

MAJOR DRAINAGE STRUCTURES COMPLETED DURING YEAR 1928

	No.	Cost	Average Cost
4-Ton Bridges	6	$2,549.10	$ 424.85
8-Ton Bridges	2	1,250.39	625.20
12-Ton Bridges	None		
No. 72 Flumes	1	510.77	510.77
No. 84 Flumes	None		
No. 96 Flumes	None		
No. 108 Flumes	1	812.79	812.79
No. 120 Flumes	1	831.45	831.45
No. 132 Flumes	None		
No. 144 Flumes	None		
Special Flumes (Pipe)	7	8,367.94	1,195.42
Special Culverts	1	2,208.24	2,208.24

AVERAGE COST OF DRAINAGE STRUCTURES

Bridges

	1925 Average	1926 Average	1927 Average	1928 Average	1923 to 1928 Inclusive No.	Amount	Average
4 Ton	$ 472.55	$ 434.62	$ 430.28	$ 424.85	152	$85,866.65	$ 564.91
8 Ton	617.79	599.21	596.83	625.20	131	97,383.40	743.38
12 Ton	976.80	None	1,051.71	None	7	8,351.38	1,193.05

Flumes

	1925 Average	1926 Average	1927 Average	1928 Average	1923 to 1928 Inclusive No.	Amount	Average
No. 72	717.31	666.53	497.36	510.77	142	105,232.90	741.08
No. 84	831.47	799.39	493.19	None	10	7,541.94	754.19
No. 96	980.42	773.69	None	None	13	12,331.99	948.61
No. 108	999.45	818.10	1,000.92	812.79	51	54,863.19	1,075.75
No. 120	1,101.63	931.14	799.08	831.45	43	48,136.94	1,146.12
No. 132	1,193.23	1,083.59	1,177.44	None	8	8,872.25	1,109.03
No. 144	None	None	923.37	923.37	1	923.37	923.37
Special Flumes	None	None	1,242.97	1,195.42	13	15,825.74	1,217.36

SUMMARY OF DRAINAGE EXCAVATION

Drains	Cubic Yards Excav. 1928	Unit Cost	Miles 1928	Total Yards To Date	Unit Cost	Mileage to Date
Ash				45,593	.138	1.50
Bonds Corner No. 1	29,756	.119	.25	85,827	.143	2.62
Calipatria No. 2				123,485	.063	2.39
Central Main Drain and Ext.				977,190	.095	14.70
Central No. 2				237,277	.065	4.41
Central No. 3				471,782	.071	7.64
Dahlia Tile				48,193	.108	2.47
Dixie No. 1				208,998	.089	4.10
Dixie No. 2				70,364	.065	1.52
Dixie No. 3, 3A and 3B				230,378	.077	4.61
Dixie No. 4 and 4A				250,559	.089	3.85
Dixie No. 4 Extension	2,088	.113	.06	2,088	.113	.06
Fig Drain	18,496	.131	.19	18,496	.131	.19
Gerrard Drain				20,952	.076	1.77
Greeson Wash				162,572	.161	8.71
Greeson No. 1				19,686	.182	.47
Holtville Main				1,097,271	.098	23.00
Holtville No. 1 and Extension				262,390	.111	5.01
Holtville No. 2				693,579	.102	10.81
Holtville 2A and 2B				136,954	.098	2.94
Holtville 2C Drain	9,227	.160	.30	99,495	.140	2.61
Holtville 2D and 2DA				197,931	.079	3.64
Holtville No. 3				157,960	.114	2.50
Holtville No. 4	119,023	.119	3.60	225,975	.103	6.12
Holtville No. 6 and Extension				441,374	.098	8.66
Holtville No. 7 Drain				114,309	.061	2.14
Holtville No. 8				459,800	.059	7.57
Holtville No. 9 and 9A				72,588	.123	2.52
Holtville No. 11				19,156	.133	.52
Martin Drain	10,470	.090	.36	10,470	.090	.36
Mesquite Drain				420,768	.068	7.52
Moss				20,948	.122	.90
Mt. Signal Drain				322,720	.067	5.40
Mt. Signal No. 1 and 1A Drains				124,142	.067	2.69
No. 9 Drain				337,675	.094	6.72
Orchid Outlet				118,394	.110	1.63
Outlets — Miscellaneous				18,297	.061	.75
Rose Outlet Drain				543,145	.100	7.80
Rose No. 1 Drain				315,863	.071	5.74
Spruce	8,672	.109	.31	238,576	.087	5.50
South Central Drain				652,051	.067	11.78
Schilling Tile Drain				4,250	.151	.64
Timothy No. 1				50,168	.072	1.61
Timothy No. 2				26,440	.098	1.68
Trifolium No. 1 Drain				518,370	.074	11.87
Trifolium No. 2 Drain				378,686	.080	7.00
Trifolium Storm				81,409	.093	3.79
Westmorland				120,716	.110	3.47
Total	197,732	.120	5.07	11,255,310	.089	225.90

COMPARISON OF COLORADO RIVER DISCHARGE AT YUMA, ARIZONA WITH DIVERSION AT HANLON HEADING

Colorado River Discharge

Year	Total Acre Feet	Maximum Sec. Feet	Date	Minimum Sec. Feet	Date
1913	11,788,300	62,500	June 10	2,600	Jan. 18
1914	20,654,400	136,700	June 14	3,300	Jan. 7
1915	14,643,200	90,000	Feb. 3	2,700	Sept. 20
1916	22,940,400**	220,000*	Jan. 22	3,800	Jan. 12
1917	20,610,600	142,900	July 4	5,300	Jan. 9
1918	13,145,300	94,300	July 3	4,100	Sept. 13
1919	10,740,000	82,600	Nov. 30	1,800	Jan. 16
1920	21,445,800	190,000	June 8	5,100	Dec. 27
1921	19,464,400	185,700	June 28	5,200	Jan. 10
1922	17,019,500	115,000	June 10	3,300	Oct. 18
1923	17,843,500	100,000	June 8	4,600	Jan. 3
1924	11,421,000	65,800	June 24	1,200	Sept. 11
1925	12,457,300	52,900	June 8	1,210	Jan. 8
1926	12,201,000	73,100	June 16	2,440	Sept. 17
1927	17,095,000	81,200	Feb. 20	2,620	Jan. 9
1928	12,781,000	98,800	June 13	2,020	Dec. 31

** Maximum Acre Feet.
* Maximum Second Feet January 22nd.

Hanlon Heading Diversion****

Year	Total Acre Feet	Maximum Sec. Feet	Date	Minimum Sec. Feet	Date
1913	1,667,343	3,419	July 25	786	Dec. 31
1914	1,863,518	4,205	July 26	802	Jan. 1
1915	1,912,931	5,003	June 23	746	Jan. 30
1916	2,218,898	5,854	June 22	1,011	Jan. 19
1917	2,270,110	5,595	Sept. 22	1,456	Aug. 16
1918	2,719,149	5,932	Aug. 17	295	Jan. 13
1919	2,656,675	6,082	Aug. 4	1,781	Jan. 13
1920	2,821,543	5,992	July 19	1,789	Feb. 28
1921	2,419,595	4,868	Sept. 17	413	Jan. 5
1922	2,890,282	5,860	July 31	1,740	Jan. 14
1923	3,275,425**	6,910	Aug. 15	2,492	Dec. 28
1924	3,078,307	7,200	July 30	1,295	***Sept. 11
1925	3,158,665	6,948	July 22	300	Dec. 15
1926	3,090,769	6,400	July 8	300	Dec. 11
1927	3,089,191	6,612	July 15	821	Dec. 27
1928	3,271,529	7,255*	July 25	989	Dec. 4

** Maximum Acre Feet.
* Maximum Second Feet July 25th.

***The wasteway from the Yuma Main Canal at Siphon Spill is between the meter station at Yuma and Hanlon Heading, which accounts for the Diversion at Hanlon Heading being greater than the discharge at Yuma on September 11th, 1924.

****This tabulation includes all water diverted from the Colorado River to the Imperial Irrigation District, except the following amounts, listed by years in acre feet which were diverted at Cerro Prieto Headgate from Volcano Lake; 1916, 17,309; 1917, 142,346; 1918, 157,685; 1919, 197,534; 1920, 274,413; 1921, 115,425.

District Bond Maturities and Interest-Issues 1 to 4, Inclusive

	FIRST ISSUE (1)		SECOND ISSUE (2)		THIRD ISSUE (3)		FOURTH ISSUE (4)					
For Calendar Year	Principal $3,500,000.00	Interest For Year at 5%	Principal $2,500,000.00	Interest For Year at 5%	Principal $2,500,000.00	Interest For Year at 5½%	Principal $7,500,000.00	Interest For Year at 6%	Total Principal Per Year	Total Interest Per Year	Total Interest and Principal 4 Issues	For Year
1915		$ 175,000.00								$ 175,000.00	$ 175,000.00	1915
1916		175,000.00								175,000.00	175,000.00	1916
1917		175,000.00		$ 62,500.00						237,500.00	237,500.00	1917
1918		175,000.00		125,000.00						300,000.00	300,000.00	1918
1919		175,000.00		125,000.00		$ 34,375.00				334,375.00	334,375.00	1919
1920		175,000.00		125,000.00		137,500.00				437,500.00	437,500.00	1920
1921		175,000.00		125,000.00		137,500.00				437,500.00	437,500.00	1921
1922		175,000.00		125,000.00		137,500.00		$ 225,000.00		662,500.00	662,500.00	1922
1923		175,000.00		125,000.00		137,500.00		450,000.00		887,500.00	887,500.00	1923
1924		175,000.00		125,000.00		137,500.00		450,000.00		887,500.00	887,500.00	1924
1925		175,000.00		125,000.00	$ 100,000.00	134,750.00		450,000.00	$ 100,000.00	884,750.00	984,750.00	1925
1926		175,000.00		125,000.00	150,000.00	127,875.00		450,000.00	150,000.00	877,875.00	1,027,875.00	1926
1927		175,000.00		125,000.00	200,000.00	118,250.00		450,000.00	200,000.00	868,250.00	1,068,250.00	1927
1928		175,000.00		125,000.00	200,000.00	107,250.00		450,000.00	200,000.00	857,250.00	1,057,250.00	1928
1929		175,000.00		125,000.00	250,000.00	94,875.00		450,000.00	250,000.00	844,875.00	1,094,875.00	1929
1930		175,000.00		125,000.00	250,000.00	81,125.00		450,000.00	250,000.00	831,125.00	1,081,125.00	1930
1931		175,000.00		125,000.00	300,000.00	66,000.00		450,000.00	300,000.00	816,000.00	1,116,000.00	1931
1932		175,000.00		125,000.00	300,000.00	49,500.00		450,000.00	300,000.00	799,500.00	1,099,500.00	1932
1933		175,000.00		125,000.00	350,000.00	31,625.00		450,000.00	350,000.00	781,625.00	1,131,625.00	1933
1934		175,000.00		125,000.00	400,000.00	11,000.00		450,000.00	400,000.00	761,000.00	1,161,000.00	1934
1935		175,000.00		125,000.00			$ 422,000.00	437,340.00	422,000.00	737,340.00	1.159,340.00	1935
1936	$ 70,000.00	171,500.00		125,000.00			377,000.00	413,370.00	447,000.00	709,870.00	1,156,870.00	1936
1937	70,000.00	168,000.00		125,000.00			396,000.00	390,180.00	466,000.00	683,180.00	1,149,180.00	1937
1938	105,000.00	162,750.00	$ 50,000.00	123,750.00			313,000.00	368,910.00	468,000.00	655,410.00	1,123,410.00	1938
1939	105,000.00	157,500.00	50,000.00	121,250.00			327,000.00	349,710.00	482,000.00	628,460.00	1,110,460.00	1939
1940	140,000.00	150,500.00	75,000.00	118,125.00			279,000.00	331,530.00	494,000.00	600,155.00	1,094,155.00	1940
1941	140,000.00	143,500.00	75,000.00	114,375.00			292,000.00	314,400.00	507,000.00	572,275.00	1,079,275.00	1941
1942	140,000.00	136,500.00	100,000.00	110,000.00			292,000.00	296,880.00	532,000.00	543,380.00	1,075,380.00	1942
1943	140,000.00	129,500.00	100,000.00	105,000.00			320,000.00	278,520.00	560,000.00	513,020.00	1,073,020.00	1943
1944	175,000.00	120,750.00	100,000.00	100,000.00			304,000.00	259,800.00	579,000.00	480,550.00	1,059,550.00	1944
1945	175,000.00	112,000.00	100,000.00	95,000.00			334,000.00	240,660.00	609,000.00	447,660.00	1,056,660.00	1945
1946	175,000.00	103,250.00	125,000.00	89,375.00			333,000.00	220,650.00	633,000.00	413,275.00	1,046,275.00	1946
1947	175,000.00	94,500.00	125,000.00	83,125.00			373,000.00	199,470.00	673,000.00	377,095.00	1,050,095.00	1947
1948	210,000.00	84,000.00	125,000.00	76,875.00			383,000.00	176,790.00	718,000.00	337,665.00	1,055,665.00	1948
1949	210,000.00	73,500.00	125,000.00	70,625.00			333,000.00	155,310.00	668,000.00	299,435.00	967,435.00	1949
1950	210,000.00	63,000.00	150,000.00	63,750.00			320,000.00	135,720.00	680,000.00	262,470.00	942,470.00	1950
1951	210,000.00	52,500.00	150,000.00	56,250.00			317,000.00	116,610.00	677,000.00	225,360.00	902,360.00	1951
1952	245,000.00	40,250.00	150,000.00	48,750.00			300,000.00	98,100.00	695,000.00	187,100.00	882,100.00	1952
1953	245,000.00	28,000.00	150,000.00	41,250.00			300,000.00	80,100.00	695,000.00	149,350.00	844,350.00	1953
1954	280,000.00	14,000.00	175,000.00	33,125.00			300,000.00	62,100.00	755,000.00	109,225.00	864,225.00	1954
1955	280,000.00		175,000.00	24,375.00			300,000.00	44,100.00	755,000.00	68,475.00	823,475.00	1955
1956			200,000.00	15,000.00			585,000.00	17,550.00	785,000.00	32,550.00	817,550.00	1956
1957			200,000.00	5,000.00					200,000.00	5,000.00	205,000.00	1957
Total	$3,500,000.00	$5,680,500.00	$2,500,000.00	$4,057,500.00	$2,500,000.00	$1,544,125.00	$7,500,000.00	$10,612,800.00	$16,000,000.00	$21,894,925.00	$37,894,925.00	

(1) Date of Issue January 1st, 1915, Matures January 1st.
(2) Date of Issue July 1st, 1917, Matures July 1st.
(3) Date of Issue October 1st, 1919, Matures July 1st.
(4) Date of Issue July 1st, 1922, Matures July 1st.

Crop Report

For Year 1928

UNITED STATES

Garden Crops		Acres
Lettuce	(1927-28)	27,247
Lettuce	(1928-29)	31,270
Cantaloupes	(1927-28)	22,635
Cantaloupes	(Fall 28)	412
Cantaloupes	(1928-29)	27,284
Honey Dews	(1927-28)	394
Honey Dews	(Fall 28)	468
Honey Dews	(1928-29)	3,338
Honey Balls	(1927-28)	75
Honey Balls	(Fall 28)	70
Honey Balls	(1928-29)	2,347
Beans		482
Cucumbers		547
Peas	(Spr. 28)	5,914
Peas	(Fall 28)	10,238
Peas	(Spr. 29)	2,019
Onions		148
Tomatoes	(1927-28)	1,717
Tomatoes	(1928-29)	1,702
Watermelons	(1927-28)	4,260
Watermelons	(1928-29)	6,207
Spinach		768
Squash	(1927-28)	400
Squash	(1928-29)	219
Cabbage	(1927-28)	156
Cabbage	(1928-29)	331
Peppers		198
Carrots		1,485
Turnips		66
Potatoes		18
Sweet Potatoes		218
Beets		84
Anise		306
Chickory		218
Endive		191
Casabas		107
Dandelion		20
Cauliflower		15
Broccoli		189
Peanuts		80
Miscellaneous		111
TOTAL		153,954

Field Crops		Acres
Alfalfa		194,915
Alfalfa (planted after Oct. 1)		33,760
Barley	(1927-28)	49,404
Barley	(1928-29)	56,840
Corn		40,126
Cotton		29,241
Oats	(1927-28)	598
Oats	(1928-29)	1,731
Wheat	(1927-28)	11,470
Wheat	(1928-29)	10,317
Bermuda		20,994
Cane		1,167
Rice		883
Sudan		1,256
Rye		120
Hemp		328
Miscellaneous		59
TOTAL		453,209

Permanent Crops	Acres
Asparagus	2,580
Apricots	50
Dates	174
Figs	58
Grapes, Malaga	2,532
Grapes, T. S.	1,650
Grapes, Other	615
Grapefruit	8,763
Olives	58
Oranges	196
Pears	24
Pomegranates	86
Strawberries	132
Pecans	137
Tangerines	121
Nursery Stock	30
Plums	22
Miscellaneous	82
TOTAL	17,310

Summary

Field Crops	453,209
Garden Crops	153,954
Permanent Crops	17,310
GRAND AREA IN CROP	624,473
Less Area Counted Twice	217,530
NET AREA CROPPED	406,943

MEXICO

	Cotton	Alfalfa	Grains	Misc.	Total
Acres	153,351	29,377	7,100	1,618	191,446*
Per cent	80.1	15.4	3.7	0.8	100

GRAND TOTAL AREA CROPPED, United States and Mexico, 598,389 acres.

* 19,700 acres were irrigated principally from the syphons installed this year at Pescadero Dam.

Water, Weather and Crop Tables

Calendar Year.	Total Area Irrigated For Year.	Total Quantity of Water Diverted for Direct Use—Acre Feet From Colorado River.	Total Quantity of Water Wasted, Lost, and Unaccounted For—Acre Feet.	Total Quantity of Water Delivered to Mutual Water Companies and Users—Acre Feet.	Net Acre Feet Per Acre Delivered to Mutual Water Companies and Users.	Rainfall—Feet.	Water Delivered Plus Rainfall During Season—Feet.	Mean Annual Temperature—Degrees Fahrenheit.	Date of Last Killing Frost in Spring Before July 15th.	Date of First Killing Frost After July 15th in Fall.	Percentage of Area in Different Crops. Cereals and Seed.	Cotton.	Hay and Forage.	Fruits, Vegetables and Miscellaneous.
1912	242,110	1,433,753	520,665	913,088	3.77	0.20	3.97	70.0	Jan. 3	Dec. 21	47.9	3.3	44.0	4.8
1913	275,797	1,667,343	551,305	1,116,038	4.05	0.16	4.21	69.9	Mar. 25	Dec. 25				
1914	316,832	1,863,518	556,251	1,307,267	4.13	0.24	4.37	71.6	Jan. 31	Dec. 13	26.6	12.3	47.1	14.0
1915	334,534	1,912,931	618,662	1,294,269	3.87	0.28	4.15	71.1	Jan. 19	Nov. 14				
1916	375,509	2,236,207	750,215	1,485,992	3.96	0.40	4.36	71.1	Feb. 2	Nov. 13	35.5	11.4	42.1	11.0
1917	435,940	2,412,455	728,016	1,684,439	3.86	0.14	4.00	71.0	Mar. 4	Dec. 11				
1918	508,210	2,876,834	878,193	1,998,641	3.93	0.15	4.08	70.9	Feb. 3	Nov. 27	31.5	36.2	21.7	10.6
1919	588,250	2,854,209	773,936	2,080,273	3.54	0.24	3.78	70.9	Feb. 25	Nov. 29	30.8	31.3	23.9	14.0
1920	603,440	3,095,956	1,009,999	2,085,957	3.46	0.41	3.87	70.1	None	Dec. 7	20.6	49.2	16.9	13.3
1921	531,674	2,535,020	726,670	1,808,350	3.40	0.50	3.90	71.8	Feb. 16	Nov. 19	31.5	31.5	31.0	6.0
1922	563,400	2,890,282	755,982	2,134,300	3.79	0.21	4.00	70.6	Feb. 6	Jan. 3	26.2	33.1	28.2	12.5
1923	530,000	3,275,425	1,741,003	1,534,422	2.90	0.29	3.19	70.0	Feb. 11	Jan. 1	15.1	44.8	30.0	10.1
1924	544,338	3,078,307	1,413,934	1,664,373	3.06	0.06	3.12	72.5	Jan. 23	Dec. 19	13.7	45.5	27.9	12.9
1925	586,545	3,158,665	1,377,807	1,780,858	3.04	0.25	3.29	71.1	Jan. 18	Dec. 12	13.4	40.9	30.3	15.4
1926	546,402	3,090,769	1,281,863	1,808,906	3.31	0.54	3.85	72.6	Feb. 2	Dec. 14	16.0	29.1	36.1	18.8
1927	545,216	3,089,191	1,208,573	1,880,618	3.45	0.39	3.84	72.9	Jan. 24	Dec. 7	16.8	23.5	39.8	19.9
1928	578,689*	3,271,529	1,064,443	2,207,086	3.72	0.02	3.74	72.0	Jan. 18	Nov. 16	22.4	20.5	35.3	21.8

Previous to January 1st, 1923, water wasted, lost and delivered, based on deliveries to Mutual Water Companies, since that time on deliveries to water users.

NOTE:—Deliveries to land based on orifice measurement and are at least 10% less than actual as shown by tests.

* In addition to the irrigated acreage herein given for 1928, 19,700 acres were served through the Colorado River Land Company's siphons at Pescadero Cut and by the Alamo "6B" Canal.

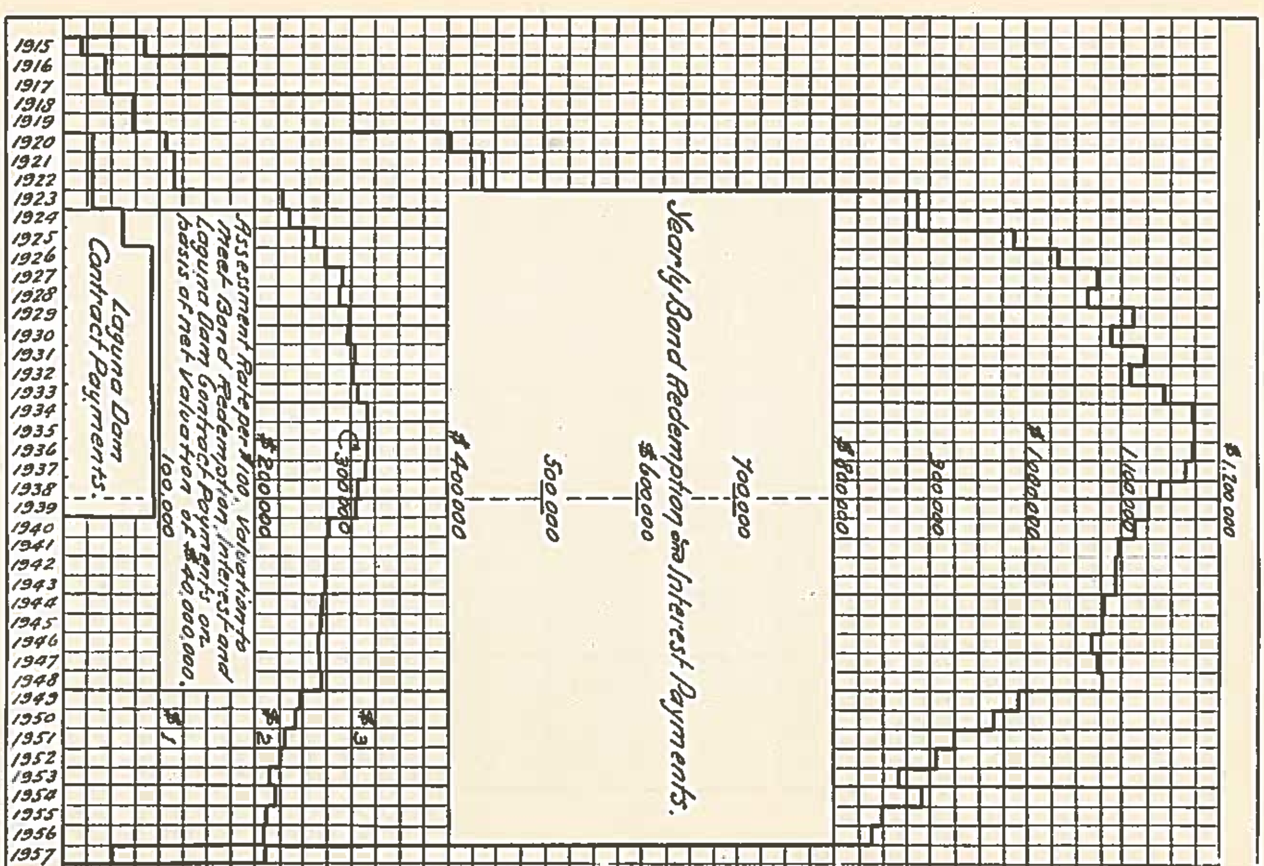
55,577 acre feet of water, which was delivered to Alamo "6B" Canal, has been included in the above tabulation but omitted in computing "Net Acre Feet Per Acre Delivered to Users."

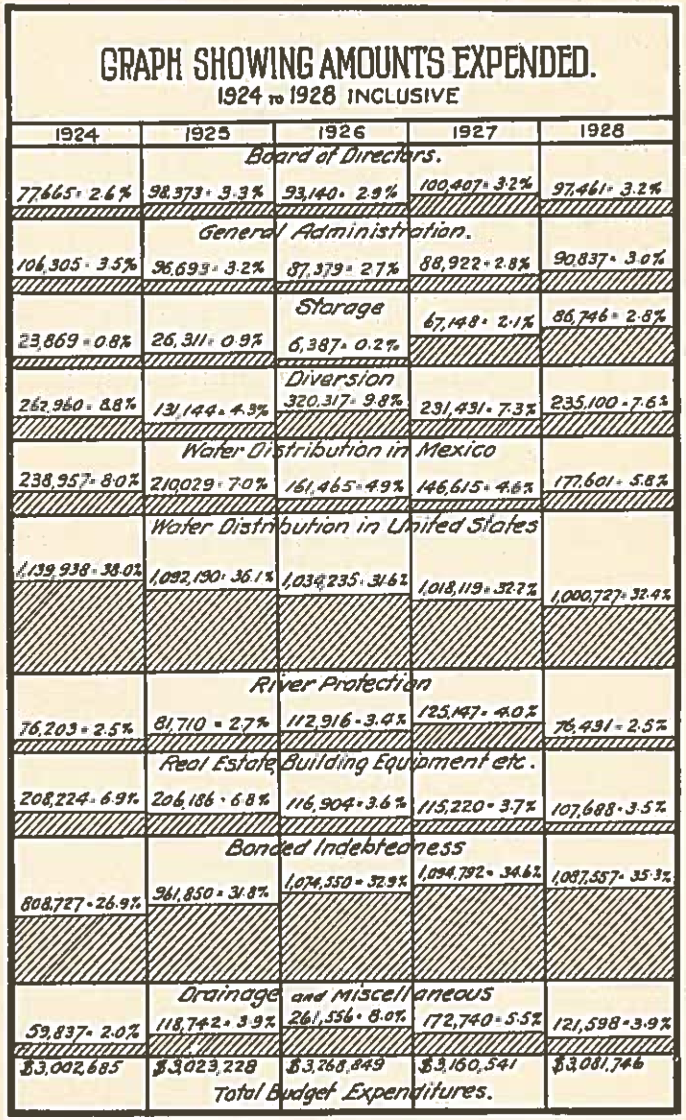
Meteorological Data---Year 1928

TEMPERATURE

Month	Mean Maximum	Mean Minimum	Mean	Maximum	Date	Minimum	Date	Greatest Daily Range
January	73.8	38.6	56.2	86	12th	29	18th	46
February	74.1	41.1	57.6	84	28th	33	16th	45
March	82.4	49.5	66.0	91	21st	42	15th	42
April	87.2	52.1	69.6	96	29th	39	8th, 9th	48
May	94.3	61.5	77.9	105	25th	53	9th, 15th	43
June	102.4	67.9	85.2	112	6th	57	11th	47
July	106.1	74.4	90.3	114	24th	62	1st	43
August	104.8	72.1	88.5	113	8th, 17th	60	4th	45
September	104.4	66.6	85.5	113	1st	54	10th	47
October	90.3	54.3	72.3	102	7th	45	13th, 14th	46
November	78.7	44.2	61.5	88	9th	31	19th	43
December	70.2	36.3	53.2	79	30th	29	17th, 21st	45
Year	89.1	54.9	72.0	114	July 24th	29	Jan. 18th Dec. 17th, 21st	48

RELATIVE HUMIDITY		PRECIPITATION IN INCHES			WEATHER		
Month	Per Cent	No. Days Over .01	Monthly	Greatest 24 Hours	Clear	Partial	Cloudy
January	44				27	1	3
February	38	2	.27	.14	20	5	4
March	35				28	2	1
April	30				27	2	1
May	29				29	1	1
June	21				30	0	0
July	27				24	7	0
August	30				28	3	0
September	19				30	0	0
October	23	1	.01	.01	26	4	1
November	26				25	3	2
December	31				24	4	3
Year	29.4	3	.28	.14	318	32	16





SALTON SEA ELEVATION

July, 1921—January, 1929

Date	Sea Level
July 1st, 1921	—249.1
Jan. 1st, 1922	—249.2
July 1st, 1922	—249.2
Jan. 1st, 1923	—249.9
July 1st, 1923	—250.2
Jan. 1st, 1924	—249.1
July 1st, 1924	—249.0
Jan. 1st, 1925	—250.2
July 1st, 1925	—249.9
Jan. 1st, 1926	—249.7
July 1st, 1926	—248.8
Jan. 1st, 1927	—247.8
July 1st, 1927	—247.0
Jan. 1st, 1928	—246.4
July 1st, 1928	—246.0
Jan. 1st, 1929	—246.5

STATE OF CALIFORNIA, }
COUNTY OF IMPERIAL. } ss.

R. H. Maddux, being first duly sworn, deposes and says:

That he is employed as Business Manager of the Imperial Irrigation District, in which capacity he is in charge of the District's Books of Account; that he has at the request and on the behalf of the Chief Engineer and General Superintendent of the Imperial Irrigation District, caused to be compiled from said books of account the above financial statements and statistics and that said statements and statistics and all thereof are true and correct to the best of his knowledge and belief.

R. H. MADDUX, Business Manager
Imperial Irrigation District.

(SEAL)

Subscribed and sworn to before me this sixth day of August, 1929.

M. W. WASHBURN,
Notary Public in and for the County of Imperial, State of California.

My Commission expires May 12th, 1932.

Approved:

M. J. Dowd, Chief Engineer and General Superintendent.
Imperial Irrigation District.