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TWENTY-EIGHTH ANNUAL REPORT

OF THE

BOARD OF WATER & POWER COMMISSIONERS

OF THE

CITY OF LOS ANGELES

FOR THE FISCAL YEAR ENDING

JUNE 30, 1929

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Twenty-eighth

ANNUAL REPORT

of the

BOARD *of* WATER AND POWER COMMISSIONERS

of the

CITY OF LOS ANGELES
CALIFORNIA

for the

FISCAL YEAR ENDING
JUNE 30, 1929

DEPARTMENT *of* WATER *and* POWER

Commissioners

J. R. RICHARDS, President
R. F. DEL VALLE, Vice-President
WILL E. KELLER
WM. P. WHITSETT
JOHN R. HAYNES

Secretary of Board
JAS. P. VROMAN

General Manager and Chief Engineer
H. A. VAN NORMAN

Chief Engineer of Water Works
F. E. WEYMOUTH

Chief Electrical Engineer
E. F. SCATTERGOOD

Controller
L. M. ANDERSON

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Roll of Commissioners
and their
Tenure of Office

Herman Silver, President	February,	1902,	to February,	1903
Chas. H. Toll	February,	1902,	to February,	1903
J. C. Drake	February,	1902,	to February,	1903
F. W. King	February,	1902,	to February,	1903
H. T. Lee	February,	1902,	to February,	1903
L. A. Grant	February,	1902,	to December,	1904
J. M. Elliott	February,	1902,	to July,	1907
Jno. J. Fay, Jr., President	February,	1903,	to February,	1910
Wm. Mead	February,	1903,	to July,	1907
M. H. Sherman	February,	1903,	to January,	1910
Fred L. Baker	January,	1905,	to March,	1908
John R. Mathews	July,	1907,	to March,	1911
John H. Norton	July,	1907,	to March,	1911
R. F. Del Valle, President	March,	1908,		
Wm. D. Stevens, President	February,	1910,	to March,	1911
H. T. Lee, President	February,	1910,	to April,	1912
P. M. Johnson	March,	1911,	to May,	1912
A. N. Davidson	March,	1911,	to June,	1912
James C. Kays	March,	1911,	to April,	1912
S. C. Graham	April,	1912,	to June,	1913
Chas. Wellborn	April,	1912,	to December,	1912
F. G. Henderson, President	May,	1912,	to July,	1913
R. D. Wade	June,	1912,	to August,	1913
Jno. W. Kemp	March,	1913,	to December,	1917
Boyle Workman	July,	1913,	to January,	1917
M. P. Snyder	July,	1913,	to May,	1917
Byron Erkenbrecker	August,	1913,	to January,	1919
L. H. Valentine	January,	1917,	to August,	1917
C. H. Eubank	August,	1917,	to July,	1918
John F. Andrews	October,	1917,	to February,	1919
Howard Robertson, President	December,	1917,	to January,	1922
E. R. Young	July,	1918,	to January,	1923
Lester L. Robinson	January,	1919,	to January,	1923
Frank Simpson	February,	1919,	to January,	1921
John R. Haynes	January,	1921,		
A. G. Bartlett	January,	1922,	to February,	1923
Jas. B. Baker	January,	1923,	to August,	1927
C. A. Dykstra	January,	1923,	to April,	1926
Jno. A. Burton	February,	1923,	to July,	1924
Wm. P. Whitsett	July,	1924,		
J. R. Richards, President	July,	1926,		
Will E. Keller	August,	1927,		

Letter to City Council

Los Angeles, California, August 1, 1929.

To the Honorable, the Council of the

City of Los Angeles.

Gentlemen:

The Board of Water and Power Commissioners herewith submits its Twenty-eighth Annual Report, covering the activities of the Department of Water and Power for the fiscal year ending June 30, 1929.

The continued growth of the city, as reflected in the demands for water and electric service, has severely taxed the resources of the Department of Water and Power. The abnormally low rain and snow-fall during the past winter, has seriously affected the city's water and hydro-electric power supply for the coming year. At the same time, additions and betterments to the water and electric distribution systems, are not keeping pace with the city's growth, because of limited finances. Financially the Water and Power Systems are in a sound condition, and earning substantial surpluses. These surpluses are, however, far from adequate to meet the demands for additions and betterments to the Systems.

On November 1, 1928, the second reduction in rates for electricity in eighteen months was made by the Bureau of Power and Light. This meant a saving of $700,000.00 annually to consumers served by that Bureau.

After more than fifty years of service with the Water Works System of the City of Los Angeles, Mr. William Mulholland resigned as General Manager and Chief Engineer of the Bureau of Water Works and Supply, on December 1, 1928. Few men are privileged to serve in one institution for half a century, and none have ever played a more important part in the growth of any city, than Mr. Mulholland. His great vision, and dare to do the seemingly impossible, enabled him to carry to successful conclusion, the greatest project of its kind, making it possible for the City of Los Angeles to be what it is today. The Los Angeles Aqueduct is a lasting monument to a great genius, and a great man, who has earned a well deserved rest, and who has the good judgment to enjoy some of the fruits of his labor before it is too late.

Reference is hereby made to the reports of the General Manager, and Controller, for full data and statistics, concerning the operation and financial condition of this Department.

The Board takes pleasure in expressing its appreciation of the splendid co-operation and service of heads of departments and employees of the Department of Water and Power.

BOARD OF WATER AND POWER COMMISSIONERS,

OF THE CITY OF LOS ANGELES,

By J. R. RICHARDS, President.

Report of Chief Engineer

Aug. 1, 1929.

To the Honorable, The Board of Water and Power Commissioners,
City of Los Angeles.

Gentlemen:

Permit me, herewith, to submit to your Honorable Board a report of the physical and financial operations and accomplishments of the Department of Water and Power for the fiscal year ended June 30, 1929.

The year brought to a close another period of active and expanding service by the Department for the citizens of Los Angeles. Before entering upon a detailed exposition of the Department's operations, may I review briefly a few of the more important and significant phases of the year's work and problems.

CONTINUED DROUTH

The continued drouth which has prevailed during the past seven years and which was in no-wise relieved during the past year, confronts the Department with a serious water and hydro-electric supply problem. During the past year, the flow of Owens River was only 56 per cent of normal, the snow crop on the Sierra Nevadas being even lighter than it had been in preceding years. This continued shortage of supply, coupled with an ever increasing demand for water, emphasizes the necessity of pushing forward, without unnecessary delay, the Colorado River Aqueduct project.

ADDITIONAL STORAGE REQUIREMENTS

One of the most pressing problems confronting the Department at the close of the fiscal year just past is that of providing large additional reservoir storage capacity at the Los Angeles end of the Aqueduct. The continued drought, coupled with a rapidly increasing consumption of domestic water, faces the Department with the imperative necessity of making such additional storage available for use without delay.

A Board of Consulting Engineers retained by your Board about a year ago recommended that 100,000 acre feet of reservoir storage should be made available in or near the city. At the present time, only 45,000 acre feet are available.

Failure of the water bonds to carry at the June election has handicapped the Department in providing this necessary storage. However, detailed engineering studies were carried forward during the year and tentative plans have been outlined which offer some relief through increasing the capacities of Upper and Lower San Fernando and Chatsworth Reservoirs.

INCREASED POWER AND WATER SALES

A healthy and normal growth in population and in commercial and industrial activity in Los Angeles during the past year is clearly revealed in the increased volume of water and electricity sales, as compared to previous years.

Water sales show an increase of 4.3 per cent over the previous year; electric sales were increased 8.3 per cent over the preceding twelve months.

OPERATING COSTS REDUCED

That sound and conservative business methods have been applied in every branch of the Department's operations appear to be indicated by the fact that operating costs have not increased in the same proportion as have water and power revenues. Operating expenses in the Power System show an increase of only 7.3 per cent for the year ended June

30, as compared to the previous year, while the Power System's sales, as already stated, increased 8.3 per cent. In the Water System, the total operating expenses show an actual decrease of 3.8 per cent over the previous year, notwithstanding an increase in sales amounting to 4.3 per cent.

SURPLUS EARNINGS

Surplus earnings realized by the Water System, after meeting all operating expenses, interest on outstanding general water works bonds, and after making due allowance for depreciation, amounted to $1,847,-298.52. This surplus, in view of the failure of proposed water bonds last June, however, is altogether inadequate to meet the pressing need for capital money by the Water System.

In the Power System, surplus earnings, after full allowance was made for all operating expenses, interest on all outstanding power bonds and for depreciation, amounted to $3,626,972.23. This is an increase of 18½ per cent over the previous year, and is especially notable in view of the marked reduction in electric rates put into effect on the Power System in November, 1928.

A detailed review of the operations of the Department's Water System and Power System is given in the attached report.

Water System

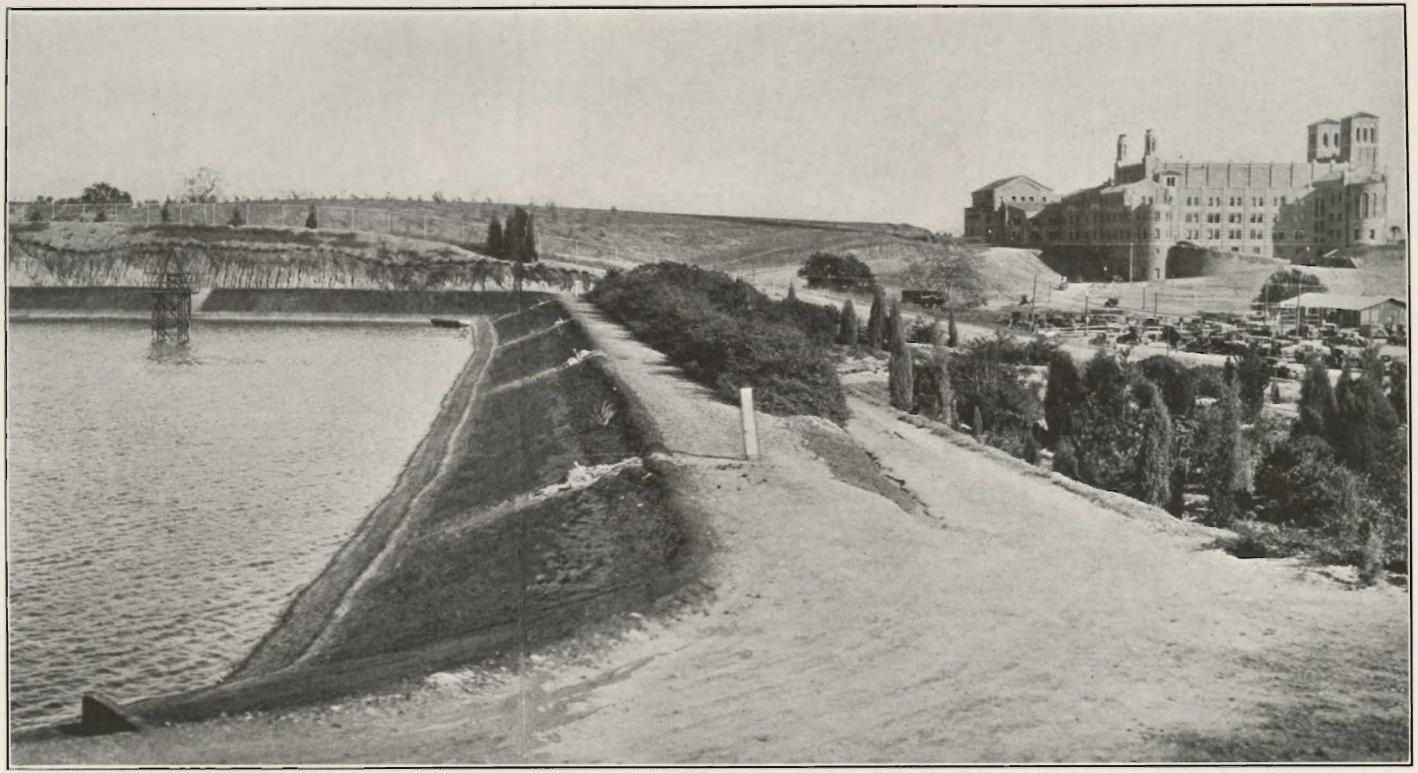
F. E. WEYMOUTH, Chief Engineer of Water Works

Chief attention has been given in recent months to the problem of securing, with the least possible delay, the additional storage capacity that is considered essential for emergency holdover and regulation of the discharge of the Owens River Aqueduct. An intensive effort has been made to locate new reservoir sites with feasible construction costs, suitable elevations, and within reasonable distance of the City's water distribution system.

Among the sites for which preliminary studies have been made, (including comparative cost estimates, topographic surveys, and drilling and test pits as found necessary) are the following: Bell Canyon, Calabasas, Los Virgenes Valley, Malibu Creek, Dry Canyon (Hollywood Hills), Vejor Valley, Bishop Road, Effie, Russell Valley, and Sepulveda Canyon. These are of very varied importance, size, and feasibility, and most of the detailed work has been done on the first two of the list.

In Bell Canyon, four miles west of Owensmouth, a possible reservoir basin was found, with a capacity from 5,000 acre feet to 19,600 acre feet. The damsite which appeared most advantageous was exhaustively studied and tested in great detail, preliminary designs and cost estimates having been made for several capacities. The findings were then submitted to the Board of Engineers, convened in Los Angeles on May 30, 1929. It was the conclusion of this Board that the damsite was of doubtful quality and the recommendation was made that this dam be not constructed until other possibilities in the region had been more thoroughly investigated.

A topographic survey and a limited amount of field exploration was then made to determine the feasibility of the Calabasas reservoir site, in the Santa Monica Mountains above the southwest corner of the San Fernando Valley. Preliminary figures showed that the development of this project would be relatively expensive, due in part to the excessive cost of connecting it with the existing system. Consideration of this reservoir was, therefore, given up temporarily, pending the examination of other storage possibilities.



SAWTELLE PRESSURE BREAK RESERVOIR
Showing Landscaping on Down-Stream Slope of Dam

An investigation of the feasibility of raising the Lower San Fernando Dam was made in great detail, including thorough testing to determine the condition of the present fill. This was done by means of test pits, shafts, auger holes and rotary core drill holes on cross-sections of the dam at right angles at its axis and about 500 feet apart. The drill holes along the axis of the dam, into bedrock through the center hydraulic core, showed the latter to be tight and plastic. Borrow pits to secure earthfill material were explored by test pits and borings, and sufficient material of good quality was found within 2000 feet of the dam.

The proposed improvement consists of raising the crest of the dam from elevation 1130 feet (capacity 14,700 acre feet) to elevation 1142 feet (capacity 18,900 acre feet), reinforcing the downstream toe, constructing a new and larger spillway, and making other incidental betterments to bring the storage up to the level originally contemplated for this site. Preliminary estimates were approved by the Board of Engineers, and final designs then prepared and submitted to the State Engineer. A tentative approval of these plans has been obtained, subject to certain slight revisions and alterations. Construction work on this project is now well under way.

Topographically, the Chatsworth Reservoir offers greater possibility for economical additional storage than any other of the City's reservoirs, or than any of the proposed new reservoir sites, mentioned above, within reasonable distance of the City. Unfortunately, however, the geological features of this site are not particularly favorable. The hills near the lower end of the valley, where the dams must be located, contain appreciable deposits of a very light, chalky material, and the valley floors are somewhat soft and unstable. Numerous plans for the enlargement of this reservoir have been prepared, up to a capacity of 63,000 acre feet, and many test borings made, to determine the suitability of foundation conditions in various possible dam sites. Extensive testing has also been done to secure data as to the availability and suitability of local materials for use in construction of an earth fill dam.

Preliminary plans for enlarging this reservoir have been considered by the Board of Engineers and definite recommendations have been made as to the safe limit of dam height, capacity, and other design features, and that further tests be made to establish more certainly the character of the foundation material. Tentative plans confirming to the findings of the Board have been made, and the additional testing is now under way.

Preliminary plans and comparative estimates have been prepared for securing additional storage capacity of 2000 to 5000 acre feet at Upper San Fernando Reservoir. The cost was found to be relatively high, however, so this construction has been indefinitely postponed.

Office studies have been made, in greater or less detail, of sources of additional water supply for the city, to supplement the present flow available from the Owens Valley Aqueduct, the Los Angeles River and the numerous wells. Reports were prepared based on proposals which involve diversions from Mono Basin, Walker River Basin, South Fork of Kern River, Mojave River, and Little Rock Creek. Detailed investigations are being continued as to the possibilities of the Mono Basin supply, to serve as a reserve until the Colorado River Aqueduct project can be completed.

Owens River Aqueduct Division

J. E. PHILLIPS, Engineer

WATER SUPPLY

The expected break in the continued drouth of the past several years has again failed to materialize. Early season snow surveys in the Sierra Nevada Mountains during the past winter, indicated that we might have at least a normal year. Later surveys, however, revealed that, while the snow coverage was good, the snow was of very low water content. Also,

that the ground base was very dry and in a condition to readily absorb a large proportion of the water from melting snow. The resulting immediate yield of water, therefore, has been relatively small.

Year	Yearly Mean In Sec. Feet	Per Cent of Mean	Year	Yearly Mean In Sec. Feet	Per Cent of Mean
1906-07	670	190	1918-19	335	95
1907-08	457	130	1919-20	231	66
1908-09	387	110	1920-21	225	64
1909-10	437	124	1921-22	330	94
1910-11	440	125	1922-23	321	91
1911-12	494	140	1923-24	211	60
1912-13	253	72	1924-25	149	42
1913-14	395	112	1925-26	230	65
1914-15	457	130	1926-27	275	78
1915-16	477	136	1927-28	309	88
1916-17	437	124	1928-29	198	56
1917-18	380	108			

PUMPING OPERATIONS

In order to furnish an adequate supply of water through the Aqueduct, it has been necessary to operate all of the available wells in the Independence region south of the Poverty Hills throughout the entire year. An average of 52 wells operated during the year, pumped the equivalent of 75 second feet continuous flow, or a total of 52,698 acre feet of water. With the exception of six wells in the vicinity of Aberdeen, which have operated part time for irrigation, all of the wells in the Independence region have been supplying water to the Aqueduct.

The attached table shows the monthly means of number of wells operated, second feet and acre feet output from the Independence region for the fiscal year 1928-29.

MAINTENANCE AND OPERATION

The present year has been one unusually free from interruptions in the flow of the Aqueduct, only one shut-off having been made. This was for a period of five days in April for the purpose of making the annual inspection. This inspection showed, that with the exception of occasional spots of eroded and rough bottom from Haiwee south, and spots of rough side wall immediately north of Haiwee, the Aqueduct is in excellent condition and capable of delivering its full designed capacity of 400 second feet.

TINEMAHA RESERVOIR

The Tinemaha Reservoir which is capable of impounding 16,627 acre feet of water, has just been completed. Work on this project was started January 2nd, 1927, and involved the construction of an earthfill dam with heavy rock protecting face; outlet works having a maximum capacity of 1300 second feet; a 10,000 second foot overflow spillway; and the relocation and construction of seven miles of the Southern Pacific Company's narrow gauge railroad.

The dam, which has a maximum height of 35 feet and a total length of 5853 feet, contains 423,000 cubic yards of dry earth-fill and 73,000 cubic yards of black lava rock obtained from excavation of the spillway at the east end of the dam was used to riprap its upstream face. This facing varies from 24 feet thick horizontally at the crest of the dam, to 10 feet thick at the lower toe. This rock makes an excellent protecting face against wave action, as it has a specific gravity of 2.75 and consists of uniformly graded sizes, ranging from small pebbles to rock having a maximum diameter of five feet.

The outlet control works consists of a 20 foot diameter, concrete gate tower, located near the upper toe of the dam at its westerly end and provided with three 4 foot by 5 foot sluice gates hydraulically operated.

CCC

The outlet pipe from the gate tower is an 8 foot diameter, reinforced concrete pipe, passing underneath the dam and discharges water into the old river channel below the dam.

All of the work of reconstructing the railroad was done by the Department forces, except the laying of the track, which was done by the Southern Pacific Company.

This reservoir will be an important factor in the regulation of the flow of the Owens River, making it possible to equate the flow of the river so that the greater portion of its water may be diverted into the Aqueduct without waste into Owens Lake.

FAIRMONT DAM

The work of raising Fairmont Dam to elevation 3043, was completed December 15, 1928. This construction involved the placing of 134,000 cubic yards of dry earth fill, the placing of 16,223 square yards of 6 inch concrete facing on the new portion of the dam, the construction of a concrete spillway, and the construction of a concrete wall for protecting the caretaker's house and the shore abutment of the suspension bridge to the gate tower. Much of the concrete facing on the old portion of the dam was repaired where needed, and the whole given a 2 inch coating of gunnite.

The raising of the dam has increased the storage capacity of the reservoir 1500 acre feet and created greater head for power development at San Francisquito Power Plant No. 1.

HAIWEE DAM

Extreme high winds, causing excessive wave action on Haiwee Reservoir during the winter of 1927-28, eroded the rock facing on South Haiwee Dam, making it necessary to place approximately 8700 cubic yards of rock on the face of the dam during this last year. Work was started October 4, 1928, and completed November 3, 1928.

WELL DRILLING

Seven wells were drilled and tested during the year, in the vicinity of Laws, and one well started in the Aberdeen region. The Laws wells are 16 inch diameter, and range in depth from 340 feet to 602 feet. Six of the wells on test produced 4 second feet of water each, and the seventh, 4.5 second feet.

These wells, including those in the vicinity of Bishop, previously drilled, make a total of 20 wells which the Department has drilled in the Bishop-Laws area. From tests made when drilled, their total initial production should be about 70 second feet of water. To date, only three of the wells in this area have been permanently equipped for pumping.

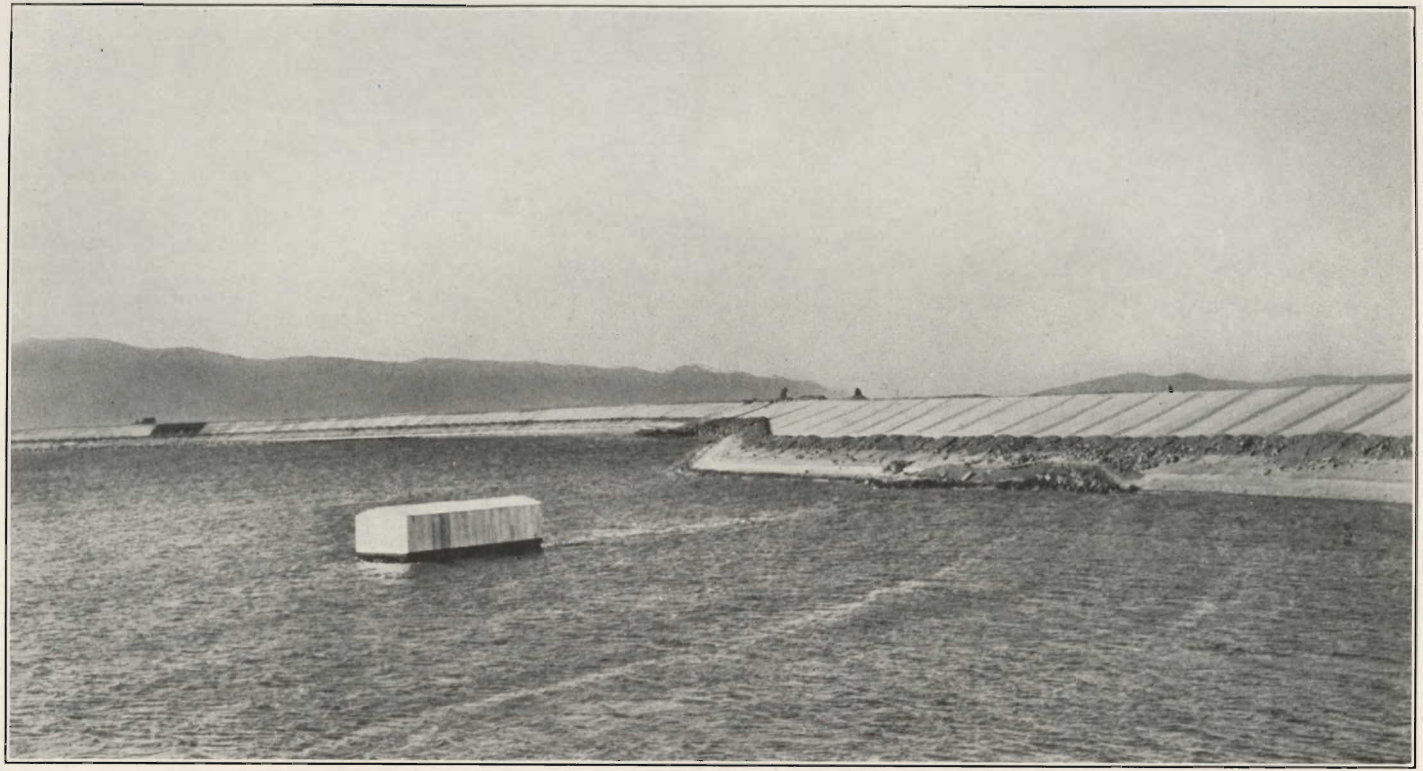
CONCRETE PIPE LINES AND CANALS

The program of installing concrete pipe lines and concrete lined ditches to convey water from wells and creeks in the Independence and Aberdeen regions to the Aqueduct, was completed during the last fiscal year.

This program involved the laying of 97,000 lineal feet of concrete pipe ranging in diameter from 12 inches to 24 inches, and the construction of 2600 lineal feet of concrete lined ditch, the latter being concreted by the gunnite method. All of the pipe used was manufactured at the Department plant at Independence.

Previous to installing these pipe lines, the water from wells was conveyed in open unlined ditches, with a resulting loss of water by seepage, and also the transportation of large quantities of eroded material into the Aqueduct.

Two miles of unlined ditch was also constructed to convey Goodale Creek water and water from wells in that vicinity to the Aqueduct. This ditch is in tight material and lining did not seem to be necessary.



FAIRMONT RESERVOIR
Showing New Concrete Facing on Up-Stream Slope of Dam

DRAINAGE DITCHES

The construction of the "A," "A-1" and "C" drainage ditches in the vicinity of Bishop, having a combined length of 15 miles, together with the deepening and widening of two miles of the old Longyear ditch along Colling Road at the southerly terminus of the "A" Drain, was completed in June of this year. These ditches are four feet wide on the bottom, eighteen feet wide at the top, and have an average depth of seven feet. They are excellently serving the two-fold purpose of draining a large area of water-logged land and contributing to the water supply for the Aqueduct. Their average combined discharge into the Owens River during the last year has been approximately 25 second feet. This flow will be materially increased during normal and wet years and is water which, without the drains, would be lost by evaporation.

SEISMOLOGICAL STATIONS

In cooperation with the Carnegie Institute of Washington, Seismological Research Division, two buildings for the purpose of housing seismographs, for recording earthquakes, have been constructed in the Owens Valley during the year.

One station is located at South Haiwee Dam and another at Tinemaha Dam. These stations will be equipped by the Carnegie Institute of Washington, and are a step in line with the Institution's program of a network of similar stations throughout Southern California.

ROAD CONSTRUCTION

The construction of 3500 lineal feet of road in the Soda Hill region, and 4000 lineal feet of road leading to the south end of Pine Tree Canyon Siphon, was completed during the year. Work was also started in the construction of 3200 feet of road in Midway Canyon, between Pine Tree Canyon and Mojave. The completion of these roads will make all portions of the Aqueduct in the Mojave Division completely accessible for maintenance and operation.

In cooperation with the County of Inyo, the Department has constructed about three miles of the proposed road from Carroll Creek to Horseshow Meadows on Cottonwood Creek, and has contributed labor and material to the value of $5,000.00 for construction of a road to Onion Valley on Independence Creek.

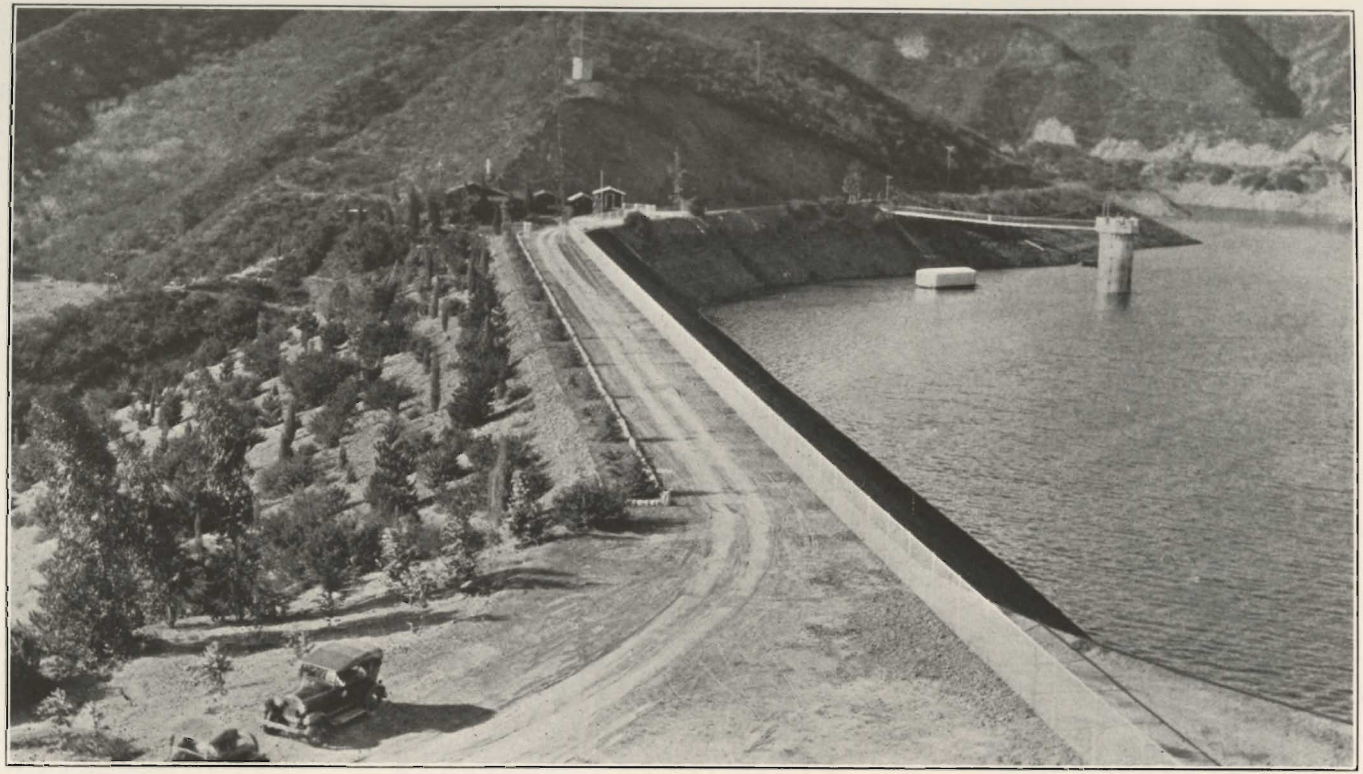
TELEPHONE LINE

The construction of the new telephone line between Independence and Fairmont has progressed during the year, the line being completed as far south as Jawbone Canyon, with the exception of a short gap in the vicinity of Little Lake, where the right of way is still in question. It is expected that this line will be completed to Fairmont by December of this year.

INDEPENDENCE HEADQUARTERS

Occupancy of the new office building and warehouse at Independence began the early part of this fiscal year. This building is a commodious structure, of pleasing lines, and one which is not only a credit to the Department, but adds another architectural unit to the increasing number of such public buildings in Owens Valley.

Independence is now headquarters for all four divisions operating in the Owens Valley, namely—Commercial Division, Owens River Aqueduct Division, Land Division and Power Operating Division. The Branch Headquarters at Lone Pine was abolished as such, in January of this year.



STONE CANYON RESERVOIR
Showing Landscaping on Down-Stream Slope of Dam

RANCH BUILDINGS

In connection with the land operations in the Owens Valley, it has been necessary to repair and make habitable a great many of the ranch buildings occupied by tenants of City-owned lands. Buildings and grounds under private ownership, in the majority of cases, had been allowed to lapse into a bad condition. In line with the policy of the Department to maintain as much of the Owens Valley land as possible under cultivation, and to keep its buildings and grounds in a neat and presentable state of preservation, a considerable force of men has been employed in this work. Two ranch houses were completely destroyed by fire during the year, both of which have been replaced by new structures. In order to offset the lack of fire-fighting facilities in the Valley, the Department is building a chemical fire-fighting apparatus mounted on a truck chassis, for use in protecting City-owned property from such disastrous fires.

Water Distribution and Operation

W. W. HURLBUT, Engineer

The growth and increased use of water has been due to the expansion of the city westerly in the vicinity of the new University and Westwood District, and the extreme south-westerly portion of the city. While there has also been substantial improvement in the high value and commercial districts of the city, coupled with the extreme dryness and warm weather, an unusual demand has been placed on the distribution system.

The local rainfall for the season just closed amounted to 12.66 inches, this is a deficiency of 17 per cent below normal, while the rainfall for the previous year was 38 per cent deficient. This, coupled with the subnormal record of the preceding eleven years, gives us a mean of 12.4 inches, or 81 per cent of the normal rainfall for this period. This condition of low precipitation has affected our ground water storage which has been depleted to an alarming extent. The mean flow of the Los Angeles River at Crystal Springs for the year just closed, was 73.1 second feet and the draft on all city wells on the coastal plane was 15.9 second feet. In the Harbor District wells, the mean flow was 12 second feet and the Vanowen wells, 3.8 second feet. The total local supply was 104.8 second feet, or 31 per cent of our total consumptive use, which amounts to 340.4 second feet for the year, leaving a draft of 235.62 second feet, or 69 per cent of this total to be drawn from the Los Angeles Aqueduct and storage.

GROUND WATER DEVELOPMENT—SAN FERNANDO VALLEY

In order to safeguard the city and be able to take care of the deficiency in our supply that would be caused by an interruption in the flow of the Los Angeles Aqueduct, or the continuation of the drought conditions that are now prevalent, it has been decided to completely develop the ground water emergency supply of the upper San Fernando Valley. This requires a supply of approximately 100 second feet. This makes necessary the drilling of six additional 29 inch wells easterly along Vanowen Street from those wells drilled in 1924-25. Six lots have been purchased, three equally spaced between Tujunga and Vineland Avenues, on the south side of Vanowen, and three on the south side of Kittridge Street, at 600 feet intervals, easterly from Vineland Avenue. This extends our operations practically to the Burbank line. The first well in this string is being drilled and should be put on test the latter part of July.

This supply can be distributed to the city south of the Santa Monica Mountains by way of the Franklin Canyon trunk line, and the Franklin Reservoir, and the Lankershim trunk line, and the Hollywood Reservoir.

BETTERMENTS AND IMPROVEMENTS

The resources of the water distribution system over the past seven or eight years have been taxed to their utmost, to keep up with the abnormal growth of the city and its consequent demands for service.

As a result of this excessive demand upon the system and limited financial resources, many needed betterments and improvements to the water distribution system have been deferred from year to year, until at the present time the system is in very great need of some extensive betterment work. There are many places in the city where the water pressure will be very low during the coming summer, if hot weather prevails with the consequent demand for water.

In the Harbor District, the entire water supply comes from wells, and while the water is very soft there is a slight amber color and a slight odor which are objectionable to some people. This, with the growing demands in the Harbor District, makes it imperative that some extensive work be done in that District.

There should be undertaken as quickly as finances are available, a comprehensive program of enlargement of trunk lines, mains, installation of additional wells, pumping plants and the construction of two or three small reservoirs, totalling in all approximately $6,500,000.

The need for this construction work being put under way was outlined and provided for in the recent bond issue. It will be possible, by changing our plans somewhat, to proceed with some of the most urgent work, totalling about $750,000 during the coming year, out of remaining 1926 Water Works Bonds and Water Revenue.

However, the need for carrying out this full program is so urgent and the water situation in Los Angeles is in such a serious shape, that arrangements to re-submit to the voters a bond issue covering these requirements, should be made at the earliest possible moment.

MAINS

142 miles of pipe for street mains was purchased during the year, of which 132 miles was cast iron and weighed 17,456 tons. Ten miles of this pipe was of the large diameter welded steel and riveted.

208.42 miles of water mains, four inches in diameter and larger, were installed during the year, bringing the total length of mains in the water works system up to 3,358.61 miles.

Of the total mains installed, approximately 128 miles was in the main city district, 25 miles in the Harbor District and 55 miles in the San Fernando District.

GENERAL AND DISTRICT WAREHOUSES

The gross issues of the warehouses during the year amounted to $2,835,480.

The turn-over in stock in all the warehouses averaged 206 per cent.

TRANSPORTATION

The Transportation Section operated with 528 automobiles and trucks, 29 trailers and 22 pieces of equipment specially mounted on trucks, at the close of the present fiscal year. This shows an increase of 16 automobiles and trucks over the preceding year. This addition to the fleet was made necessary, due to the requirements for additional equipment on the Colorado River project, and the land appraisals in the Owens Valley. This fleet of cars traveled 5,419,192 miles, at an operating cost of 8.75 cents per mile, as compared with 512 cars traveling 5,313,365 miles for the previous year, at an average cost of 9.01 cents per mile. This represents a saving in total operating cost of .26 of a cent per mile.

Distribution Construction and Operating Division

THOS. BROOKS, Engineer in Charge

The total length of mains installed, four inches in diameter and larger, was 152.944 miles, of which 128.088 miles were in the main City District and 24.856 miles in the Harbor District. This is practically the same as the total installed in these districts the previous year.

A total of 28.463 miles of mains were laid in Municipal Improvement Districts, of which 14.372 miles were in the main City District and 14.091 miles were in the Harbor District.

The Department installed during the year under various Street Improvement Acts, 37.840 miles of mains in the main City District and 0.611 miles in the Harbor District.

PIPE ACQUIRED

Tract No.	Owner	Length of Pipe	District
9300	Pacific Land Corp.	1.588 Miles	Westgate
7011	Vine Crest	1.010 Miles	Hollywood
.....	Glendale City	.723 Miles	Eagle Rock

In addition, 2.725 miles of pipe were installed by private contractors and turned over to the Department under Street Improvement Acts. Of this amount, 2.393 miles were in the Harbor District and 0.332 miles in the main City District

STREET IMPROVEMENTS

The past year was noteworthy for the number of street improvements on major traffic lanes requiring changes on important trunk lines. Among them were:

The old 30 inch riveted steel line on the hillside above Riverside Drive from the High Bridge at Fletcher Drive to the Dayton Avenue Bridge was replaced by a 40 inch line in Riverside Drive. The total length of this trunk line was 12,330 feet, of which 2829 feet were ¼ inch riveted steel pipe and 9501 feet were 5/16 inch steel bell and spigot pipe with automatic electrically welded longitudinal seams.

A fill with a maximum depth of 18 feet was made on Vermont Avenue, between Fourth and Sixth Streets, requiring the temporary removal of 1250 feet 30 inch Cast Iron, for a period of over eight months.

The construction of the First Street viaduct over the Los Angeles River, made necessary the relocation of 197 feet of the 30 inch riveted steel Santa Fe trunk line around the west abutment of the viaduct.

Approximately 600 feet of the 24 inch Cast Iron Garvanza Trunk Line were lowered, due to improvement of Fletcher Drive westerly from Avenue 36.

Another fill on Third Street, between Berendo Street and Kenmore Avenue, necessitated the changing of the grade of the 27 inch riveted line for a distance of 598 feet, requiring the installation of 465 feet of reconditioned pipe.

Improvement of Glendale Boulevard was the cause of lowering 54 feet of the 30 inch high gravity trunk line on a private right-of-way south of Waverly Drive.

It was necessary to lower 469 feet of 24 inch Cast Iron on Angeles Mesa Drive southerly from Santa Barbara Avenue, due to reestablishment of street grade.

In connection with the effect of street improvements on the work of this Division, mention is made of 118,964 feet of pipe, mostly 1 inch and 2 inch, used for temporary side lines during the year.

Three other jobs of a similar nature must be done in the near future. They are:

The re-installation of 1250 feet 30 inch Cast Iron on Vermont Avenue from Sixth Street to Fourth Street, and the replacement of 8300 feet of riveted steel pipe with 30 inch Cast Iron on the same street from Fourth Street to Santa Monica Boulevard.

The replacement of the old 18 inch riveted line on North Broadway from College Street to the Los Angeles River, with a 24 inch Cast Iron main.

The contract for the improvement of Fountain Avenue having been let, approximately 200 feet of 42 inch riveted steel pipe must be lowered to clear the new street grade.

Another contemplated reestablishment of grade is that on Seventh Street from Figueroa Street to Lucas Avenue, requiring the lowering or the installation and removal of approximately 1400 feet of 24 inch Cast Iron, through a maximum cut of 16 feet.

The installation of 13,738 feet of 20 inch Cast Iron Pipe in conjunction with the two and one-half (2½) million gallon Harbor City Reservoir, and 50,000 gallon hemispherical steel tank, was completed during the year.

Construction of the Palisades Reservoir, with a capacity of over 6,365,000 gallons, means that the Westgate District will have a double ended supply and a consequent decrease of fire hazard when necessary to shut off the trunk line.

Purchase of the Pioneer Truck Company property on Alameda and Jackson Streets, adjacent to the Ducommun Yard and Warehouse, will provide much needed space for pipe, storage, automobile shed, salvage yard.

The weather during the summer of 1928, having been comparatively cool, water consumption was not excessive. Consequently, complaints of poor pressure were practically nil. However, due to the very warm weather during June of 1929, there has been a marked increase in water consumption (at once showing where the distribution system needs bolstering). To meet the natural growth of the city and peak demands during continued warm summer months, the following trunk lines are recommended for construction during the coming year:

RECOMMENDED IMPROVEMENTS

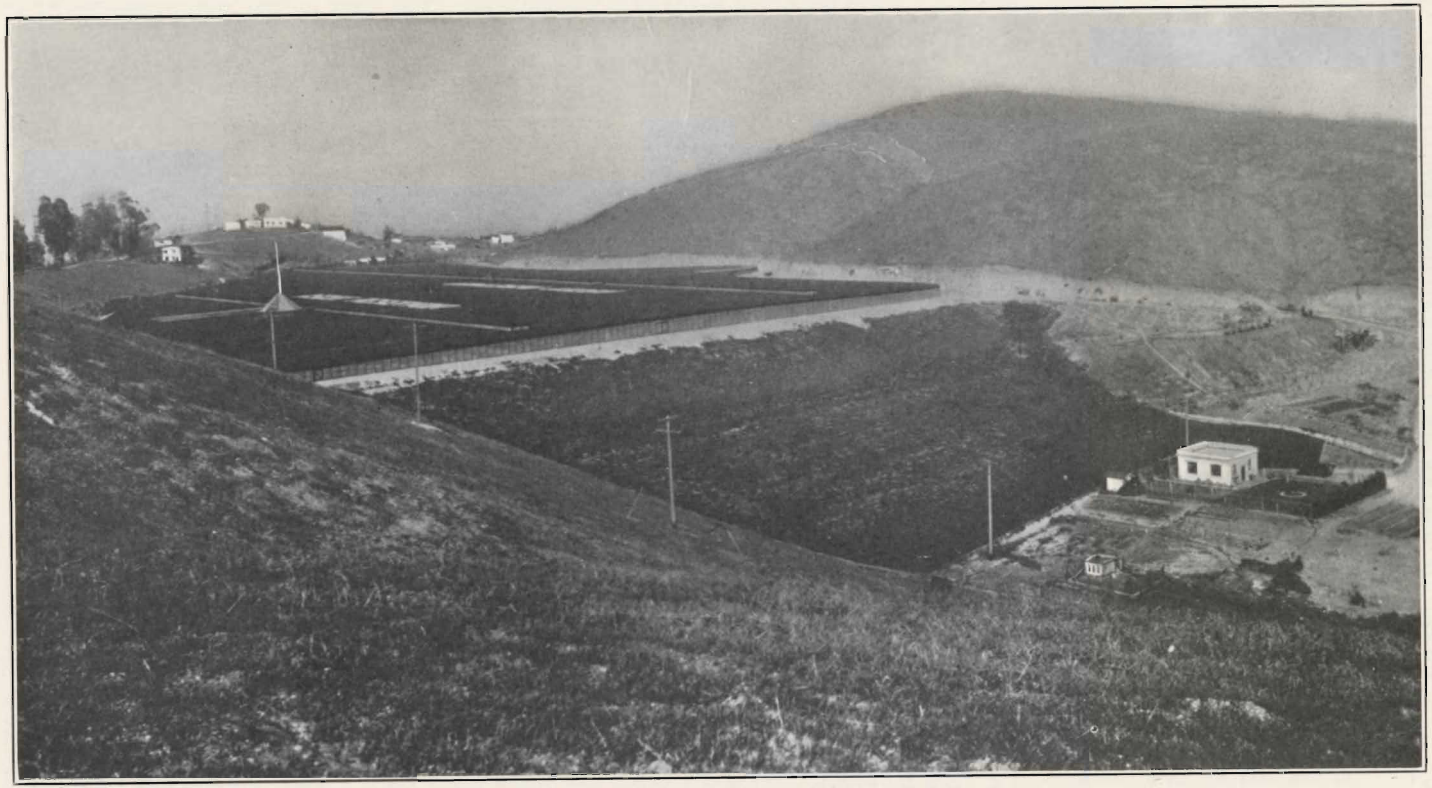
The 24 inch Marengo Street and Soto Street trunk line should be completed at the earliest possible time, by replacing about 700 feet of 10 inch with a temporary 24 inch riveted line under the Pacific Electric tracks under the old Marengo Street Bridge, this temporary line to be replaced with cast iron of the same size when a new concrete viaduct is constructed some time within the next five years.

Another important line that should receive immediate attention is one that will deliver more aqueduct water to Third Street and Western Avenue.

The 24 inch Cast Iron trunk line on Sunset Boulevard should be continued from Sanborn Avenue to Figueroa Street, to bolster up the supply for Angeleno Heights and the higher portions of the business district and give these districts a much needed double ended supply.

A district that is in need of an additional supply of water is that portion of the city in the low gravity supply zone north of Pico Street, between Western Avenue and Santa Fe Avenue. It is recommended that this needed supply be taken care of by installing a 40 inch line from the end of the 68 inch trunk line below the Lower Franklin Reservoir to a point in the vicinity of Eleventh Street and Western Avenue. From this point, a 30 inch line on either Eighth Street or Tenth Street should be continued to Central Avenue. Poor pressure conditions which were reported in the neighborhood of Fifth Street and Alameda Street, and at Twelfth and Main Streets, will be alleviated by this proposed line.

A twenty (20) million gallon reservoir near the westerly terminus of Slauson Avenue is needed to improve pressures in the Angeles Mesa District



ASCOT RESERVOIR, COVERLID IN 1928

ELECTROLYSIS SURVEYS

Regular routine electrolysis surveys of practically all the substations of the two street railway companies, were made during the year and certain minor changes made wherever such changes would effect substantial betterment of electrolysis conditions.

In cooperation with the other utility electric companies, a special study was made of the region affected by the substation at Sixteenth Street and Central Avenue. This investigation resulted in the railway enlarging its negative feeding system.

The study started last year to determine the cause of the graphitis corrosion of cast iron pipe, was continued; and of the several cases under investigation, no particular cause could be designated, due to the complexity of conditions favoring such corrosion. This study is being continued.

A study was made on commercial paints and pipe coatings, to determine their effectiveness against stray-current electrolysis and against under-water conditions. None of the paint or coating tested was able to withstand without puncture a potential of six (6) volts longer than 20 minutes and all broke down under immersion within three months.

SAN FERNANDO VALLEY DISTRIBUTION SYSTEM

A total of 55.485 miles of mains were laid in the San Fernando Valley system during the year just closed, making a total of 832.421 miles of mains in this district. Six old wooden flumes of the Chatsworth highline were replaced with 68 inch and 78 inch diameter riveted steel syphons, and 1300 feet of 39 inch De Soto Street trunk line, encased in concrete, from Sherman Way southerly. This line was badly pitted and it was necessary to thoroughly clean and spotweld this pipe before the reinforcing mesh and concrete were placed.

At the Chatsworth Reservoir, 1½ miles of road on the east side and ¼ mile of road between Dams No. 2 and No. 3, were built. At the Lower San Fernando Reservoir, 2½ miles of road were built around the north and east side from the east end of the dam. The completion of this road gives us access to the entire perimeter of the reservoir. Also 1600 feet of six-strand barbed wire fence was constructed on the easterly side of the Lower San Fernando Reservoir.

All reservoirs in this district are now under complete weed control. To accomplish this, 300,000 gallons of fuel oil were used during the last fiscal year. This oil was applied as a mixture of one third oil and two thirds water, and was sprayed under pressure on all weed growths which made themselves evident above the high-water line of the reservoir and over the reservoir bottoms as the water receded. This treatment has been in effect two years now, and we have succeeded in getting a 98 per cent kill of all weed growths, tulles and willows. This method has resulted in material savings from a maintenance standpoint, in connection with the sanitary control on the margin of these lakes, as well as giving the property a neat and pleasing appearance.

Reservoir and Pumping Plants Division

FRED J. FISCHER, Engineer

As shown in attached table the total amount of water pumped during the year was 28,633,833,875 gallons, of which 16,496,278,204 gallons, or 57.6 per cent, was pumped from wells, and the remaining 12,135,555,671 gallons or 42.4 per cent, was raised from one level to another. The corresponding figures for the preceding year are 23,429,531,143 total gallons pumped, of which 11,824,406,140 gallons, or 51 per cent, was pumped from wells and the remaining 11,605,125,003 gallons, or 49 per

cent, was raised from one level to another. This works out to be 39.5 per cent increase in the well water production and 4.5 per cent increase in the water handled by step-up plants, and 22 per cent increase in the total water handled by pumping equipment. The average daily pumpage for the year was 78,250,000 gallons—an increase of 14,250,000 gallons, or 22 per cent, from the figure for the preceding year, which was 64,000,000 gallons.

PUMPING PLANTS

During the past year, the following new pumping stations were added to the system:

Ninety-Ninth Street Pumping Station
Started July 13; capacity, 5,700,000 gallons per day.

Grand View Wells
Started July 28; capacity, 12,800,000 gallons per day.

Alta Vista Pumping Station
Started March 10; capacity, 2,100,000 gallons per day.

Granada Pumping Station, No. 1
Started March 13; capacity, 5,000,000 gallons per day.

Granada Pumping Station, No. 2
Started March 20; capacity, 2,300,000 gallons per day.

Harbor City Pumping Station
Started May 18; capacity, 460,000 gallons per day.

Tujunga and Orcas Temporary Pumping Station
Started May 20; capacity, 1,400,000 gallons per day.

Wonderland Avenue Temporary Pumping Station
Started May 29; capacity, 360,000 gallons per day.

Barnes City Pumping Station
Started June 22; capacity, 640,000 gallons per day.

New buildings were built for pumping plant or other purpose, as follows:

Harbor City Pumping Station	Concrete
Granada No. 1 Pumping Station	Brick
Granada No. 2 Pumping Station	Brick
Alta Vista Pumping Station	Brick
Lower Franklin Chlorinating Station	Concrete
Bellevue Reservoir Keeper's House	Wood Frame
Buena Vista Pumping Station and Garage	Wood Frame
Hollywood Reservoir Core Vault	Concrete

Wooden roofs were built over Ascot, Bellevue, Wonderland and Garvanza Reservoirs.

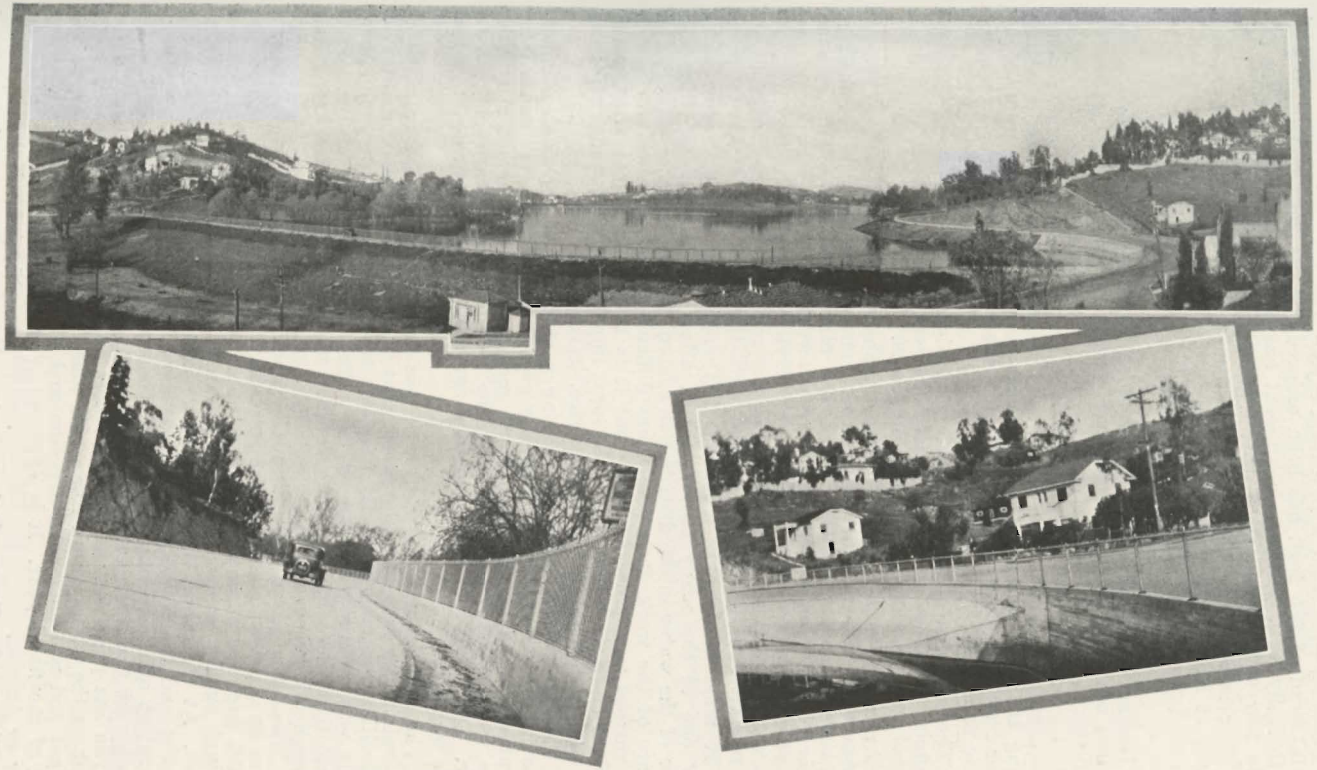
Substantial steel fences were built around Silver Lake and Hazard Reservoirs and the Ninety-Ninth Street Pumping Station.

New wells have been drilled as follows: Headworks Pumping Station, 4; Figueroa Pumping Station, 1; Slauson-Compton Pumping Station, 1; Barnes City Pumping Station, 1. The last three of these are now in service.

A Venturi tube with a capacity of 125 second feet was constructed and installed in the 68 inch outlet main of the Lower Franklin Reservoir. This meter will be used for regulating the automatic chlorinating machines which are to be installed in the new chlorinating plant at the location, as well as to measure the outflow from the reservoir.

Two additional chlorinating machines were installed at the San Fernando Chlorinating Station.

The old steam pumping equipment at Garvanza Pumping Station was scrapped to make room for a new 3250 gallons per minute, 350 foot head, pumping unit which is now being installed at that plant.



SILVER LAKE RESERVOIR AND CHLORINATION PLANT
(Insets) Type of Construction Employed for Sanitary Control

Pumping equipment with a total capacity of 100 second feet, against a total head of 225 feet, has been ordered for the new development at North Hollywood. Pumping equipment has also been purchased for the three new wells which were drilled on the Tujunga Wash.

New screens of an improved design were installed on the tower outlets at Hollywood and Ascot Reservoirs.

SANITATION

During the year ending June 30, 1929, the biological laboratory handled more water samples than during any other similar period in its history. This is the natural result of the proper extension of our control over a system which is rapidly expanding and becoming daily more complicated. The total number of bacteriological samples examined during the year was 14,541, while 3600 plankton samples, representing water from various reservoirs and tanks, were put through the laboratory in the same period.

The number of complete mineral analyses made was 163, while an indefinite number of partial analyses were made in connection with control measures and special investigations.

Approximately 62 tons of copper sulphate were used in algae control measures conducted in the various reservoirs during the year. An effort has been made to maintain all of the distribution reservoirs in even better condition as regards plankton growths, than has been secured in the past. The condition of water in service during the month of June was unusually good, but, of course, the real proof of the adequacy of our plankton control will not appear until the latter part of the summer.

It must be frankly admitted that control of plankton growth is only one of the many factors which affect the problem of odor and taste of the water in the distribution system. Because of the complicated nature of the work, it is sometimes difficult to assign definite value to the various measures employed, but it is believed that the suppression of plant and animal growths is the most important single factor affecting the odor and taste of water in service.

This laboratory has been making a study of bacteriological conditions in the ocean water along the coast to determine the amount of pollution caused by disposal of the metropolitan sewage off Hyperion. This work has been paid for by the Engineering Department of the City. The number of bacteriological samples examined during the fiscal year was 2192.

The roofing of Ascot Reservoir has amply justified the opinion expressed in the last annual report, that this was the proper method of controlling growths here. By the time the roof was half completed, its value was definitely proved by the reduction in growths, and since its completion there has been no further trouble with the water passing through this reservoir.

When the Lower Franklin Chlorination Plant was built, several years ago, it was placed at the inlet of this reservoir instead of at the outlet, because it was believed some of the advantages to be gained through such a location would be greater than the anticipated disadvantages. At that time there was no residential development in Franklin Canyon and there was no anticipated pollution in the lower reservoir. Operation of the plant has justified the conclusions which prompted its location at the inlet, but the menace of residential development in the canyon has prompted us to decide now upon an automatically operated plant on the outlet trunk line. This plant has been provided for in the budget and was under construction and well toward completion at the end of the fiscal year. It is expected it will be ready for operation in July or August.

Silver Lake Reservoir has during the year given ample proof of the wisdom of eliminating pollution by seagulls and the removal of carp.

The water from this reservoir has been equal to the best served in this city and there have been no difficulties due to odor and taste.

The usual sanitary patrol of the works in the San Fernando Valley and the city proper, has been continued as usual, the average number of patrol miles traveled being 2056 per month.

An important piece of research work conducted in the laboratory during the year was a study of the Harbor District water in an effort to devise a treatment process to remove color and organic matter. Owing to the characteristics of this water, the problem was a complicated one necessitating much investigation. Conventional method of water treatment failed almost completely and combinations of several chemicals which would do the required work were too expensive and too cumbersome to be practicable. It was finally found that ferric chloride used by itself and in comparatively small doses was sufficient to remove all of the color, rendering this water physically perfect. A small experimental sand filter was erected in the laboratory and operated for some time with such uniformly satisfactory results that it was decided to build an experimental treatment plant at Wilmington for the purpose of refining the details of treatment. Designs for this plant have been completed and its construction ordered. It will handle, at conventional rates, 72,000 gallons of water per day and it is believed, will enable us to secure valuable knowledge and experience in the treatment of this unusual water.

The laboratory equipment has been augmented during the year by the acquisition of a Department-built incubator which has proved very satisfactory. It increases our incubator capacity 300 per cent, providing for future growth and is equipped with a recording thermometer which gives us a graphic record of what happens in the incubator during the hours when no one is in the laboratory. Circulation by means of a fan has been provided and better incubating conditions are found than in the older incubator previously used.

Water Distribution Design Division

C. E. ANGILLY, Engineer in Charge

MUNICIPAL IMPROVEMENT DISTRICTS

Requests have been made for the formation of municipal improvement districts to supply water to Lakeside Park, Sunland and Tuna Canyon. The Lakeside Park District is westerly of Chatsworth Reservoir and higher than our present zone of service. To serve this territory, it will be necessary to install booster pumps and a storage reservoir at approximately elevation 1300. The portion of Tuna Canyon proposed to be included in a municipal improvement district may be served by the construction of additional mains and a kickback reservoir. Preliminary plans and estimates have been completed on Lakeside and Tuna Canyon Municipal Improvement Districts.

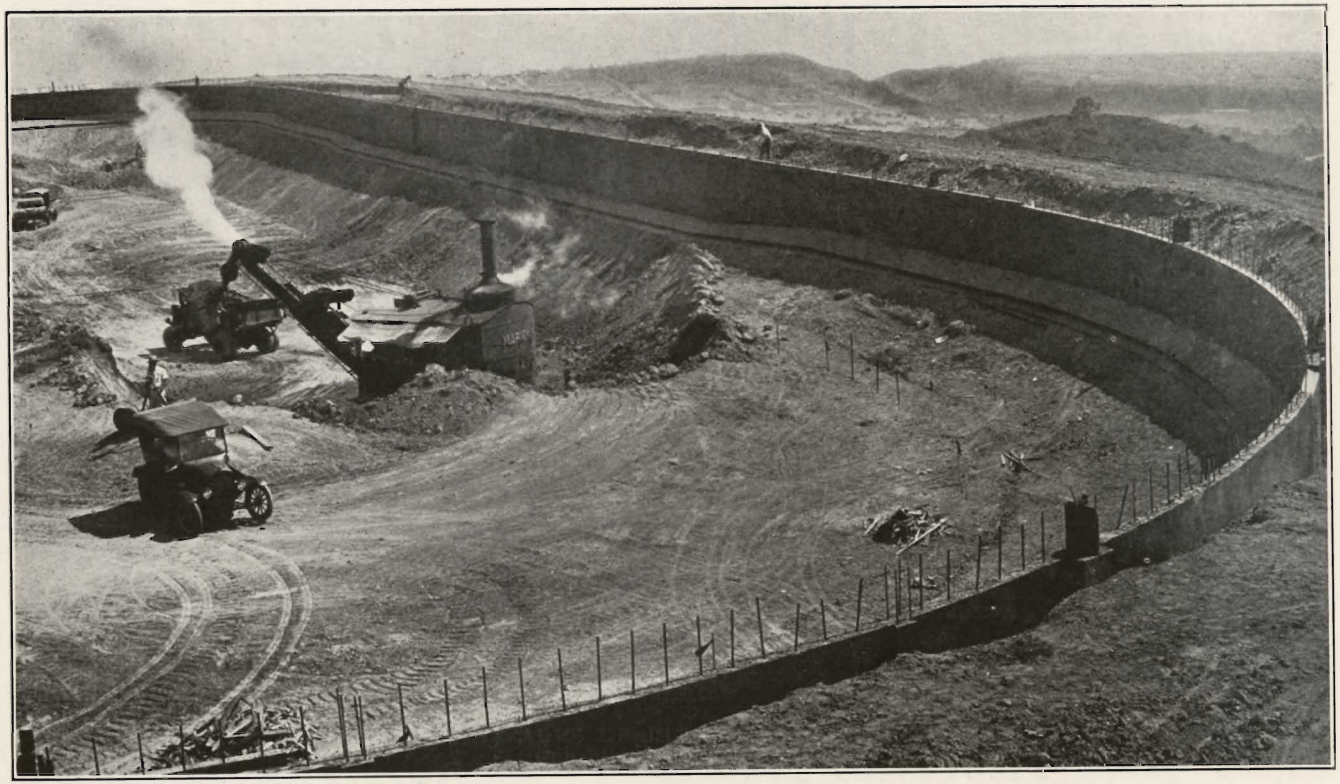
Plans for municipal improvements districts for Hollywood Knolls and a portion of Mar Vista, have been completed and elections in these districts will be held shortly.

Bonds were sold in the amount of $115,000 for the Alta Vista Municipal District in October, 1928. Bonds were sold in the amount of $140,000 in the McCalla Heights Municipal Improvement District in January, 1929.

Harbor City, Granada, Alta Vista and McCalla Heights Municipal Improvement Districts are all in the process of being completed.

PREPARATION OF PLANS

During the year, 176 plans for water systems to be installed under the provisions of the various street improvement acts, have been prepared.



PACIFIC PALISADES RESERVOIR UNDER CONSTRUCTION
Capacity, 6,300,000 Gallons

These plans include new water mains, services to vacant property and fire hydrants. The amount of work involved varies from a small amount to $116,000 on the Main and 90th Improvement District.

In addition to the above, 594 street improvement plans of the City Engineer have been checked to avoid conflict in sub-structures and protect our works.

Following out the recommendations of A. J. Wiley, F. C. Herrmann and Chas. H. Paul, the consulting board reporting on safety of water supply dams and reservoirs of the City of Los Angeles, spillways with increased capacities were designed on Tinemaha, Fairmont, Encino, Upper Franklin, Lower Franklin and Dry Canyon.

RECORDS

New subdivisions to the number of 217 have been received and spread upon the records. Extension orders to the number of 2570 have been issued and 1973 foreman's pipe reports have been received and recorded. New service reports to the number of 15,827 have been issued and recorded.

RESERVOIR PLANS

New storage reservoirs and tanks designed during the year include Harbor City Reservoir, Harbor City Elevated Tank, Hollywood Knolls Reservoir, Pacific Palisades Reservoir, Alta Vista Tank, Barnes City Elevated Tank and Granada Tanks Nos. 1 and 2. Pacific Palisades Reservoir, with a capacity of 6,365,000 gallons, will be in service during the early fall. All of the other tanks and reservoirs with the exception of the proposed Hollywood Knolls are now in service.

Harbor City Reservoir, Hollywood Knolls Reservoir and the Pacific Palisades Reservoir are concrete-lined reservoirs, with concrete roofs. This type of construction removes the objection which the nearby residents have to the appearance of a steel tank as well as protecting the water.

STRUCTURES

Included in the important structures designed by the structural section of this Division, are the Ascot Reservoir roof, Suspension Bridge Tinemaha Reservoir, concrete manhole Jawbone Division, Aqueduct crossing at Fairmont Reservoir, siphon alterations at Allessandro Street, alteration Pioneer Office Building, alterations for third floor Broadway Building and buildings for the following pumping plants: Alta Vista, Granada No. 1 and No. 2 and Harbor City.

TRUNK LINES

The North Hollywood collecting line, which when completed will deliver approximately 100 second feet to the collecting sump, is the first centrifugally cast concrete line to be installed by this Department. The total length is 20,000 feet and varies in size from 18 inch to 51 inch diameter. On the completion of this collecting line, pump plant, wells, etc., 18,000 acre feet can be developed from the ground during the heavy use period or during an emergency. This 18,000 acre feet can be considered as additional storage.

The construction of the Chatsworth Outlet Line from Chatsworth Reservoir to Hollywood Reservoir is contingent on increasing the height and capacity of Chatsworth Reservoir. The Chatsworth Outlet Line in combination with the 36 inch line from North Hollywood Wells will have a capacity of 100 second feet. The outlet line from Hollywood Reservoir and from Hollywood High Reservoir are also contingent on the increased capacity of Chatsworth Reservoir.

The line from Tujunga Wells will work in conjunction with the Mission Wells in San Fernando Valley. During the winter months, this

RESERVOIR UNDER CONSTRUCTION
Capacity, 6,300,000 Gallons

line, with the 30 inch line recently installed on Mulholland Street, and the proposed additional 24 inch on Hubbard Avenue to the 30 inch line on Mulholland Street, will be available for use in connection with spreading grounds.

The need for a reservoir at the end of the 24 inch trunk line on Angeles Mesa Drive has been continuously shown during the present period of warm weather. This reservoir with a capacity of 20 million gallons, which the preliminary studies show can be obtained, and with the necessary inlet lines and a 24 inch line on Santa Barbara Avenue, will greatly improve the pressure in that vicinity and along the Pico Trunk Line.

New business, involving the collection of $789,104.55, of which $428,421.14 was in connection with street improvement contracts, gives a fair indication of growth of the water works system. As a further indication, there is: The acquisition of water system from City of Glendale, located in the west end of Eagle Rock, with 145 new consumers; the expansion of the municipal system into a portion of Barnes City and the acquisition of 125 new consumers formerly supplied from sources other than this Department, and making possible further expansion in this territory; 2570 extension orders issued, etc.

Meters and Service Division

GEO. READ, Engineer

The total number of service connections for all purposes in the system on June 30, 1929, was 301,063; the total increase during the fiscal year was 15,827.

All active domestic, commercial, industrial, and irrigation service connections are metered; at this date there are 245,745 meters in service, including by-pass meters on fire service connection check-valves, and jet meters for sewer flush tanks.

The difference between the number of service connections and the number of meters is accounted for by unmetered service connections to vacant lots, service connections from which meters have been removed on account of vacancy, fire service connections not yet equipped with by-pass meters, flush tank services not yet jet-metered.

The Department is using extra-heavy galvanized iron pipe in fills and back of curbing; copper tubing for short ¾-inch and 1-inch single service connections; and ½-inch red brass pipe, iron pipe size, for supplying flush tanks.

A standard service connection installation is a 2-inch cast-iron pipe from the main to the curb, for the supply of two and sometimes three domestic consumers. At June 30, 1929, there had been laid 962,000 feet, or 182.2 miles, of this pipe for service connection work. Assuming the average distance from the main to the curb to be twenty feet, and an average of two service connections to each pipe, there are at this date 96,200 service connections, or 31.95 per cent, of the total number of service connections of this type of construction.

During the fiscal year the emergency crews maintained by this Division attended to repairs to service connections, mains, and fire hydrants, together with miscellaneous jobs, to a total of 17,796.

The total number of prime acres cultivated in the San Fernando Valley was 51,358; counting rotated crops, the total area cultivated was 60,358 acres. The total quantity of water applied to this acreage was 77,827 acre feet, or a duty of 1.52 on the net acreage and 1.29 on the rotated acreage.

Attention is particularly directed to tables accompanying this report, setting out in detail the large volume of work this division performs each year in connection with water meters and services.

SAN FRANCISQUITO POWER PLANT NO. 2 AS REBUILT IN 1928

Power System

E. F. SCATTERGOOD, Chief Electrical Engineer

Operating Division

T. A. PANTER, Engineer

SYSTEM OPERATION

Following the breaking of St. Francis Dam, normal operation of the City's generating system was not obtained until the second unit at San Francisquito Power Plant No. 2, was returned to service on November 1, 1928. This, together with the fact that the past year showed a continuation of the present dry cycle with its consequent low precipitation and run-off, held the amount of power generated by the Department's five hydro-electric plants to practically the same value as in the fiscal year 1927-28.

The total amount of power generated by the Department's hydro-electric power plants was 247,908,000 kilowatt-hours, measured at the switchboards. This was practically the same amount as generated in the previous fiscal year. The entire growth in demand was purchased from the Southern California Edison Company, making the total purchase for the year 430,580,135 kilowatt-hours, an increase of 19.8 per cent over the previous year. The peak demand, however, upon this purchased power was reduced to 88,992 kilowatts as against the 93,888 kilowatts of the previous year, resulting in a higher load factor, with consequent reduction in the rate of purchased energy.

The demand on the City's system indicates a substantial growth, as the total electric load for the year amounted to 660,125,000 kilowatt-hours, an increase of 11 per cent, and the distributed peak load for the system during the same period was 153,200 kilowatts, an increase of 14.9 per cent over the previous fiscal year.

The customary tabulation designated as Exhibit "A" is herewith attached, and shows in detail the operating statistics with reference to generation, purchased power and distributed power over the municipal system.

Both the Big Pine and the Haiwee Power Plants in the Owens Valley have contributed a large amount of energy during the past fiscal year for pumping purposes within the Owens Valley. The demand upon these plants during this period has shown the wisdom of making such installations, since the stream flow through the other plants would have been totally inadequate for furnishing the necessary power.

San Francisquito Power Plant No. 2 has been completely restored to normal operation, including the rebuilding of cottages, dormitory, club house and school house for the benefit of the employees. A large amount of reforestation and landscaping has been done adjacent to the plant and cottages, the results of which are already very gratifying in the changed appearance.

At San Francisquito Power Plant No. 1, the new 30,000 H.P. unit was placed in operation on December 12, 1928. The addition of this unit will provide additional peak capacity as well as additional standby, in the event of interruption to the service of purchased power. It also has permitted the rewinding of the three original units which will soon be completed.

On November 2, 1928, a new receiving station, designated as Station "C," which is a large voltage outdoor type station, located at Wilmington, was placed in operation. This station, similar in design and construction

to Receiving Station "B," furnishes another inter-connection with the system of the Southern California Edison Company and, in addition to supplying the power of the Harbor District, it also forms another tie between various portions of the system of the Department and thus increases the reliability of service.

Distributing Station No. 4, located at Figueroa Street near Slauson Avenue, obsolete due to inadequate capacity of individual switches and of the station, has been replaced by one of the large permanent type buildings and was placed in regular operation on October 14, 1928. The new Venice Distributing Station of a semi-permanent type was placed in service on September 28, 1928. This station, located at 911 Lincoln Boulevard, Venice, serves the consumers on the municipal system in the beach district.

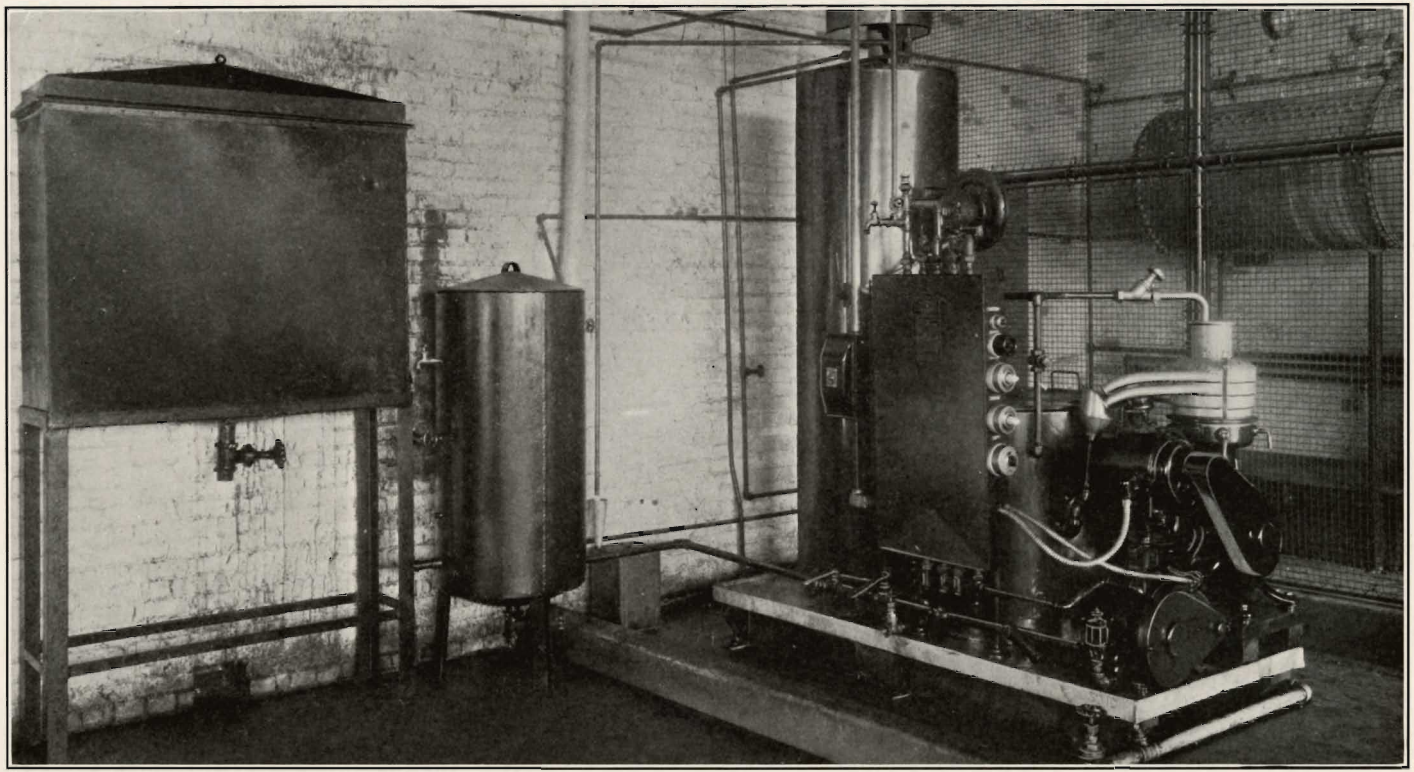
Material progress has been made toward attaining the goal of 100 per cent continuous operation set as a policy of the Department. Indicated by the fact that a reduction of 36 per cent of the already small number of interruptions of the previous year has been made, and in addition, the average length of each interruption during the present fiscal year on the receiving station bus was reduced from 106 seconds to 48 seconds. A large proportion of this improvement is due to the installation of some 1370 protective relays on the system, which function not only to isolate the trouble, but also to remove it from the system as rapidly as possible. During the year, these relays established a record of 97.5 per cent correct operation.

The installation of complete totalizing meter equipment in the dispatcher's office, has also enabled the load dispatcher to exercise finer control of the peak demand on purchased power, with the result that a saving of at least $10,000.00 has been realized during the past year. Further endeavor to improve the reliability of our service was effected by the installation of twenty-two miles of ground wire on the main transmission line between Sylmar Switching Station and Receiving Station "A," and by the wiping of 67,310 insulators and the renewal of 1556 defective insulators on both the 110,000 and 33,000 volt transmission lines. Attention is also called to the fact that during the year 12,103 clearances were issued on the system by the load dispatcher's office, without a single error in operation.

TESTING LABORATORIES

It has been necessary in order to meet the added demands on certain sections of the Testing Laboratories, to add much needed equipment. The Chemical Laboratory is now finally equipped to conduct nearly all tests required in the testing of purchased materials and experimental work. Among these additions, are included a high vacuum table and glass-blowing equipment, very essential in conducting certain tests that must be made under vacuum. Also, another section has been added to the short circuit calculating table, giving a very much-needed increase in range and utilized in the analysis of the characteristics of the entire electrical system. A new unit has also been constructed for use in testing of industrial consumers' plants, and by means of which, conditions in these plants may be very accurately determined and the cooperation between the Department and the consumers in their operation may be made more effective.

During the past fiscal year, the Testing Laboratories calibrated 51,960 watt-hour meters and made inspections on 2667 other meters, or an increase of 3436 tests and inspections over the previous year, in addition to the regular routine tests of equipment, as well as certain experimental investigations of the electrical characteristics of the system by means of the oscillograph and klydonograph that have been carried on by this section.



APPARATUS FOR RECLAIMING MOTOR VEHICLE OIL

GENERAL SHOPS

Work in the general machine shop has decreased during the year by 15 per cent, with a corresponding reduction in personnel of 26 per cent.

The general shops have during the year fabricated steel work for power plant job, tanks for large switches, office equipment, auto bodies, as well as to overhaul and repair all kinds of equipment for the system, such as automotive equipment, buildings, electric equipment, etc.

The installation of a 32-ton power-driven punch press purchased for the General Machine Shop, will enable this section to do certain work at a substantial saving over work previously sent to outside shops.

GENERAL AND DISTRICT WAREHOUSES

The gross business transacted by the Warehouses during the fiscal year 1928-29, shows a decrease of 21.1 per cent from the previous fiscal year. Indicative of the volume handled during this period, however, there were issued 10,299 poles and 4230 distribution line transformers.

In line with the Department policy of increasing the efficiency wherever practically possible, tabulating machine equipment for the purpose of handling Material Accounts was installed and the progress made by this system by the elimination of office work has been very satisfactory. An installation is now being made of the latest type of tabulating machine and gives promise of still further beneficial results in the coming year.

ELECTRICAL REPAIR SHOP

While this section completed 4140 jobs during the past fiscal year, it represents a decrease of 8.74 per cent from the previous year. This was no doubt occasioned by the fact that the general equipment on the system has been maintained at a high standard of condition. Included in the work performed were several items which may be classified as major jobs, such as the overhauling of a 25,000 kilovolt-ampere synchronous condenser, the rewinding of two 7500 kilowatt generators at San Francisquito Power Plant No. 1, the rewinding of four 5833 kilovolt-ampere transformers at San Francisquito Power Plant No. 2, and the reconditioning of the generator and the rewinding of transformers damaged by fire at the Franklin Canyon Power Plant.

TRANSPORTATION SECTION

At the close of the present fiscal year, there were in operation 431 pieces of automotive equipment, consisting of passenger vehicles, trucks and tractors. The total mileage for the year was 3,827,622 miles with an average mileage per passenger vehicle of 10,886 miles, and an average mileage per truck of 6779 miles. In addition to meeting the normal requirements of the electrical system, this Section has handled several large transportation jobs, such as the transporting of a 30,000 horse power generating unit to San Francisquito Power Plant No. 1, a bank of transformers weighing 71 tons each, to Receiving Station "C," as well as other large and heavy pieces of construction equipment.

The reclaiming of lubricating oil has continued during the past fiscal year, with a resultant saving of $3,612.49. The systematic inspection of brakes and front wheel alignment, together with the constant maintaining of tires at proper inflation, have resulted in an increase of nearly 50 per cent in tire mileage. As a result of the close supervision exercised over the various elements entering into transportation costs, this section is in the enviable position of having one of the most economically operated transportation fleets in the State.

Division of Preliminary Studies

H. C. GARDETT, Engineer

PRELIMINARY ENGINEERING

The Division of Preliminary Studies has continued to do engineering work necessary to protect and further the City's rights in various power projects, also engineering and investigations in connection with future power supply. In addition to this, the engineering forces have made detailed studies of costs of hydro and steam generation in connection with the development of Boulder Canyon power.

A considerable amount of work has been done on preliminary studies of pumping plants on the Colorado River Aqueduct, for the purpose of assisting in the determination of the most favorable route for the aqueduct, and leading to the final determination of the character, size, height of lifts and number of units and pumping plants and specifications of equipment when the location of the aqueduct is finally determined.

Preliminary plans and estimates were made in connection with the proposed development in Big Pine Canyon, including the transmission line to Power Plant No. 1, two additional plants and the proposed changes in the existing Owens Valley system.

Studies and estimates have been completed, preliminary to actual construction plans for providing additional storage above San Francisquito Power Plant No. 1, to supplement the capacity of Fairmont Reservoir as an insurance of continuity of service from the two San Francisquito and the San Fernando Power Plants.

STEAM POWER PLANT

As stated in the last report, the final court order of February 27, 1928, left the Department free to construct a steam plant except on Harbor tide lands.

However, since that time a compromise arrangement has been made with the Southern California Edison Company, settling certain pending suits on other matters and deferring the building of the steam plant. Settlements have been made with the manufacturers and pending machinery contracts cancelled. Only that work has been done during the fiscal year since this compromise was effected, that was necessary to keep abreast of recent developments in the art and the probable trend of fuels and fuel values.

BELT TRANSMISSION LINE

The purchase of rights-of-way for the Belt Transmission Line between Receiving Station "B" and Receiving Station "C," has been practically completed, and it is believed the remaining parcels will be obtained early next fiscal year.

ENGINEERING AND DESIGN

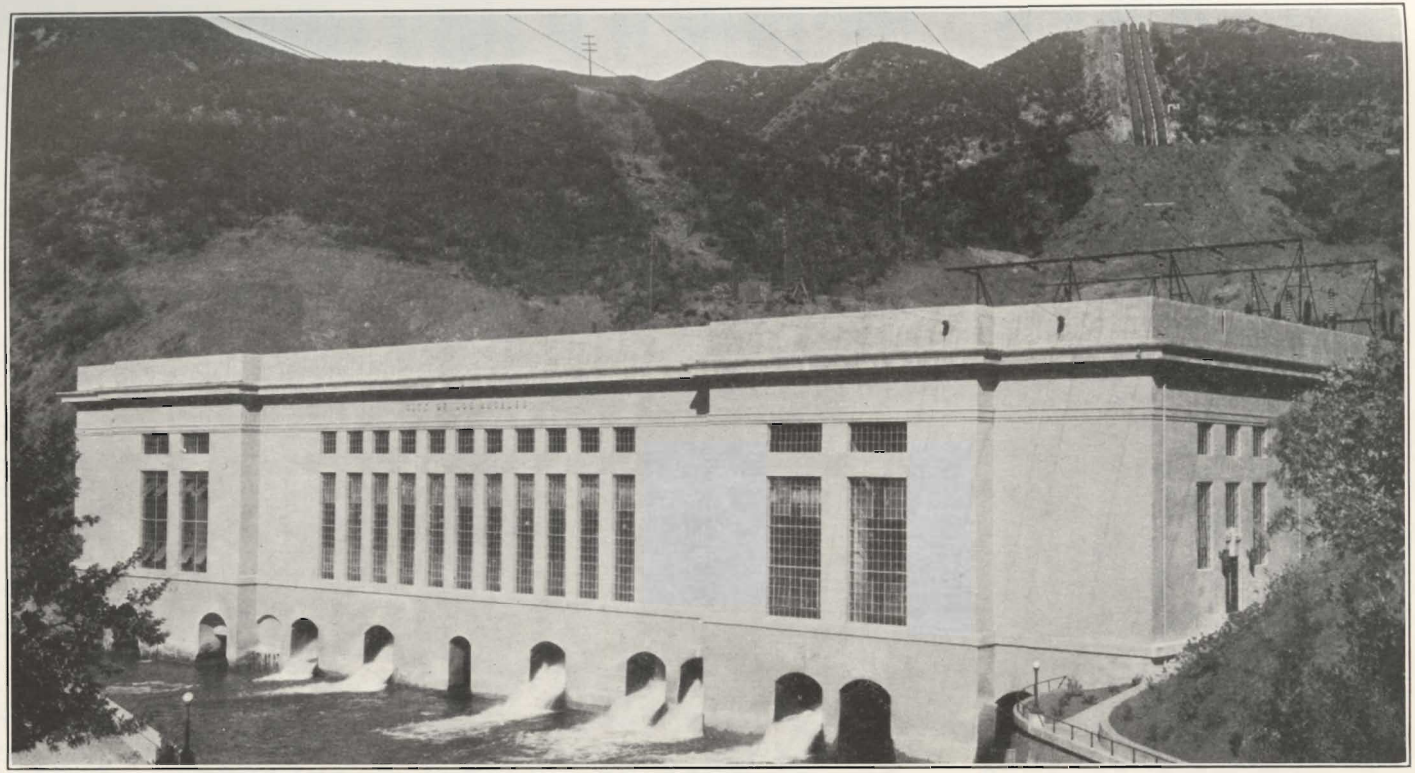
In addition to work already mentioned, this Division has designed and made plans for all generation and transmission projects built by the Division of Power Plant and General Construction during the year.

Division of Power Plants and General Construction

R. R. ROBERTSON, Engineer

HYDRO ELECTRIC POWER PLANTS

The construction work in connection with the completion of Power Plant No. 1, as described in the last annual report, was carried on through the year. The fifth unit of 30,000 Horse Power at the plant switchboard was installed and placed in operation December 12, 1928. This completed the plant to its ultimate capacity of 90,000 Horse Power.



SAN FRANCISQUITO POWER PLANT NO. 1 AS COMPLETED BY ADDITION OF FIFTH UNIT IN 1928

The building has been further improved by an entrance on the east end, intended primarily for convenience of visitors and their care with least interference with work at the plant. This, with the addition of walks and the landscaping of the approach, has greatly improved the appearance of the structure.

The work of repairing and rebuilding Power Plant No. 2, was completed, all equipment repaired and replaced and the No. 2 unit placed in operation November 1, 1928.

Permanent buildings, consisting of seven four-room houses, one five-room house, dormitory, club-house, school house, with necessary garage units, were constructed.

A water supply and sewage disposal plant were installed and the grounds were graded and planted to native shrubs and trees.

In addition, to the construction work outlined, the construction forces did a considerable amount of alteration and maintenance for the Operating Division.

MISCELLANEOUS MAINTENANCE

At Big Pine Power Plant No. 3, by the construction of division and diversion boxes, the Hession and Giroux ditches were combined to use one intake for emergency use and new intake from tail water of plant for the combined ditches.

This arrangement has resulted in increased efficiency in use of water and has proved very satisfactory to the ranchers as attested by letters received since the beginning of the irrigating season.

The purchase and installation of electrically-controlled hydraulic gate operating mechanism at Upper Franklin Reservoir, has been completed except for a contemplated control line above the bed of the canyon. This line will be completed as soon as satisfactory arrangements for right-of-way can be made.

On April 4, 1929, lightning destroyed the roof, control board and meters and damaged the switches, transformers and exciter at Franklin Power Plant.

A temporary control house was immediately erected, transformers and switches installed, exciter repaired and generator cleaned and the plant put on the line again April 10.

In connection with the repairs, it was decided to build a 21-foot addition to the Power House Building, in order to separate the operating room from the transformer room and to provide space for future 4400-volt feeders and to replace destroyed equipment with equipment of increased capacity.

Foundations for the building have been poured and repairs are being rapidly made and will be completed early in the next year.

Early in the year, camp was opened at Crooked Creek for the purpose of lining those portions of Tunnel No. 1 of the Owens Gorge project, that were liable to cave in, using the cement on hand which had been stored at Crooked Creek for several years. Equipment and camp buildings were repaired and work progressed rapidly, using up all cement on hand; a total of 3320 feet of tunnel was lined and the work completed before the setting in of winter.

BELT TRANSMISSION LINE

On this line, additional towers have been erected, insulators placed and conductors strung wherever the way has been cleared through the acquisition of rights-of-way.

As it has not been possible to arrange for rights-of-way with the Cities of South Gate and Huntington Park, no additional construction between Receiving Station "A" and Station "B" can be done.

The Construction Division has continued to maintain the loop transmission line right-of-way and the houses on such right-of-way, most of which have been leased by the Right-of-Way and Land Division.

RECEIVING STATIONS

Extensions and Betterments

An 80,000-kilovolt ampere transformer bank was installed at Receiving Station "B," as well as two large 33,000-volt disconnect switches.

Three 26,667-kilovolt ampere transformers were installed at Station "C," as well as the necessary equipment for remote power metering of Edison input.

Work has been started on the installation of six 2,000,000-kilovolt ampere oil circuit breakers for sectionalizing 33,000-volt ring bus and the installation of relay protection on the 110,000-volt and 33,000-volt buses. This work will not be completed until some time next year. A carbon dioxide fire extinguishing system has been installed in the 110,000-volt switch rooms.

DISTRIBUTING STATIONS

Station No. 4 was completed and put in operation June 30, 1929. On completion of Station 4, the outdoor station and old garage were removed. This station has picked up the load of Station 29-A, which has been discontinued.

Station 44, which was under construction at the time of the last report, was completed and placed in operation. This construction also included a new garage and troublemen's headquarters.

During the year, five 33-kilovolt industrial stations have been added to the system and five others have been rebuilt to increased capacity. Twenty-one consumers' stations were added to the system, six were enlarged and one rebuilt.

Division of Engineering Design

M. O. BOLSER, Engineer

In this period, 3537 authorizations, involving an estimated capital expenditure of $1,748,000.00 have been prepared and transmitted to the construction forces. These authorizations, together with several large uncompleted authorizations from the previous year, brought the total for the year to approximately $2,375,000.00.

33,000 VOLT SYSTEM

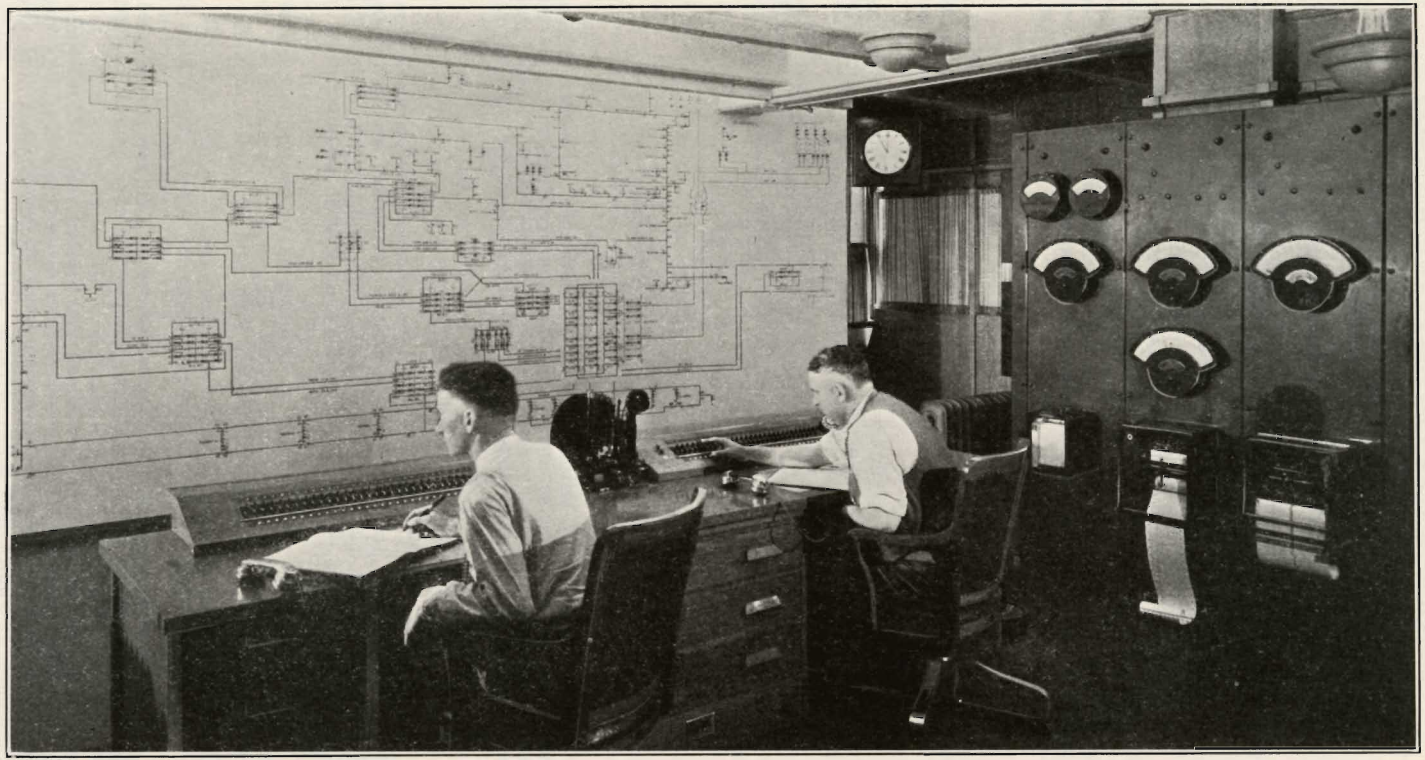
The authorizations prepared and the engineering design work completed, involved the preparation of drawings, estimates and plans for 32.1 circuit miles of additional 33,000-volt lines, and the removal of 6.1 circuit miles, making a total of 358.6 miles of 33,000-volt lines now in operation.

These plans also provided for an addition of 3.3 duct miles conduit lines and 4.6 miles of underground cable. There is in operation at the present time, 83.1 duct miles of conduit lines and 21.1 miles of underground cable.

4600 VOLT SYSTEM

These plans and specifications, provided for an addition to the 4600-volt system of 10,299 poles, 2878 transformers and the removal of 2282 poles and 1857 transformers.

There is installed in the system, at the present time, 130,000 poles and 14,157 transformers, having a capacity of 243,533 Kva. In the underground system, there was 10.4 duct miles of new conduit lines and 31 manholes, 19 vaults, 35.7 miles of cable, and 193 transformers added.



HEADQUARTERS OF SYSTEM LOAD DISPATCHER

The 4600-volt underground system at the present time totals 430 duct miles of conduit line, 989 manholes, 250 vaults, 388 miles of cable, and 818 transformers, having a capacity of 49,703 Kva.

In addition, designs were prepared for 19 joint power and telephone conduit systems in residential tracts.

STREET LIGHTING

Plans and authorizations were prepared for 59 ornamental street lighting systems, having 3844 lamps, for 243 lamps in parks, bridges and tunnels, and 1700 lamps in the overhead street lighting system.

There is a total of 61,029 lamps in operation in the ornamental lighting system and 11,410 lamps in operation in the overhead lighting system.

Plans and authorizations were prepared for the extension of the communication system by cable from Receiving Station "B" to Eighth Street and Central Avenue overhead and from this point underground to the Water and Power Building. From the Water and Power Building, it extends underground to Corto Distributing Station and from there overhead to the Commonwealth Distributing Station, totalling in all 2.8 miles of underground cable and 9.3 miles of aerial cable.

DISTRIBUTING STATIONS

Plans and drawings for the Figueroa Street Station No. 4, were completed and the station itself completed on June 20th, of this year.

The initial installation consists of six 33,000-volt lines, 10,000-Kva of transformer capacity, twelve 4600-volt regulator feeders and seven street light regulators.

The plans for the Venice Station No. 44, which was put into operation on October 28, 1928, provided for an initial installation of three 33,000-volt lines, 1500 Kva of transformer capacity, two 4600-volt feeders and one street light regulator.

The plans for this station also included a three-car garage and troublemen's headquarters.

INDUSTRIAL STATIONS

Plans were prepared for the five new industrial stations which were constructed during the year and increasing the capacity of five existing stations.

At present, there are 72 industrial stations on the system, having a capacity of 81,989 Kva.

COMMERCIAL STATIONS

Plans and estimates for the construction of fourteen indoor and five outdoor commercial stations, were prepared and the stations constructed during the year.

There are at present 160 such stations in operation, having a capacity of 59,445 Kva.

GENERAL ENGINEERING

In addition to preparing plans and specifications for work involving capital expenditure, the Design Division carried on considerable work in maintenance and general engineering.

During the year, 928 complaints relative to moving poles, service wire, etc., were investigated and 591 engineer's orders were issued to the construction forces to move poles, anchors or wires. In addition, 752 poles were moved because of street improvement work. 864 complaints

of radio interference were received and investigated and in those cases in which the department's equipment was involved, the trouble was corrected.

In order to keep our service up to proper standard, 4594 field tests were made with recording instruments. This work covered 2580 transformer load tests, 1622 voltage tests and 392 special load tests.

83 petitions asking for the vacation of public streets were investigated and in 15 instances our plant was found to be involved and our interest was protected.

Joint pole negotiations were carried on with the other utility companies and resulted in the sale of joint interests to a value of $81,850.00, and a purchase of joint interest to a value of $38,133.00.

During the year, a file of standard specifications covering the material and equipment regularly used in electric distribution was completed, and is used by the Purchasing Agent in calling for bids. All materials are tested for quality and conformity to the specifications.

RESEARCH

Research and development work has been conducted during the past year along several different lines. Some of these investigations were started previously and others have been started but not yet completed.

Important research work is now being carried on at the Harris J. Ryan Laboratory at Stanford University. It is the study of the electrical behavior of suspension insulators of various designs when subjected to dust and fog and is under the direction of the technical committee.

Important research work has been done on cable impregnating oils. This investigation has to do with the effect of dissolved gas (air) on the electrical characteristics and long-time stability of transformer oil used by 35 Kv. cable.

Considerable development work has been done in high voltage cables, as follows:

Development of liquid-filled three conductor cables with longitudinal oil ways.
Development of a practical hydraulic stop joint upon which the success of liquid-filled cables depend.
Development of cable reservoirs for use with degasified oil.
Development of an insulating oil piping connection between the cable and reservoir.
Development of liquid-tight cable terminals.

Development work is progressing on a scheme for switching ornamental street lights by the use of high frequency superposed on the 4600-volt system.

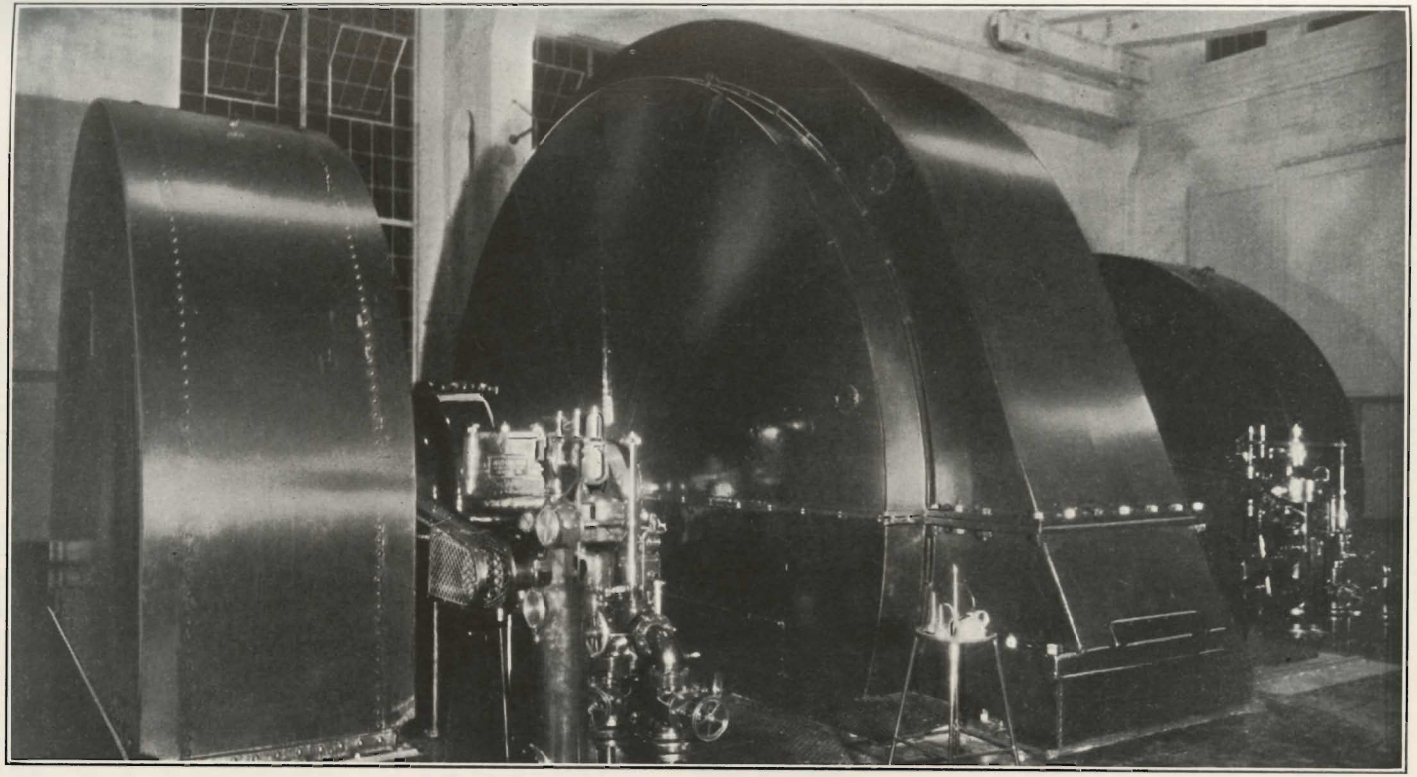
Investigation is being made of the corrosion resulting from dissimilar metals in various classes of soil; such as lead-covered cable, bare copper neutral wire, and iron service pipes.

The investigation which has been under way for the past year to obtain data indicating the amount of salt deposited on the top of an insulator, compared to the amount deposited on the under side, has been continued during the present year.

POWER DRAFTING ROOM

During the year, the drafting room made a total of 679 new drawings of various sizes. A large number of old drawings were checked and corrected and about 200 worn-out tracings were traced on new sheets. Designs of small assemblies were checked and made adaptable for use as standards.

A complete new set of yard layout drawings were made of 1630 North Main Street, using old drawing numbers. A number of obsolete



NEW 32,200 H. P. GENERATING UNIT, SAN FRANCISQUITO POWER PLANT NO. 1

maps and proposed schemes for construction were eliminated by placing the correct information on one checked drawing. All of this work has brought the records more nearly up to date.

An index to the 15,000 record drawings has been maintained. The entire index has been checked and corrected. Field book numbers have been placed on the maps and a complete field book index started.

During the year, 116,543 feet of blue prints and a large number of photostats and photographs have been ordered, received and distributed by the file clerks.

In addition to the work done on the drawings in the drafting room files, there was considerable work done for practically all divisions of the department, such as making maps for the legal and publicity divisions, calculating and checking computations and descriptions of deeds and right-of-way, making colored statistical charts and the making of a meter reading book index covering 1000 books for Commercial Division.

Power Distribution Division

H. L. CALDWELL, Engineer

The Power Distribution Division work during the past year has been confined to the routine operation and maintenance of the distributing system, together with such additional construction and the incorporation of necessary additions and betterments to maintain the system in a high degree of operating efficiency.

The placing of two new distribution stations in service during the year made necessary the rearrangement of the lines in the vicinity of these stations and the reconstruction of the lines to operate at 4600 volts.

OVERHEAD 33,000-VOLT SYSTEM

During the year, the 33,000-volt system has been extended by the construction of 22.1 miles of single circuit line and .6 mile of double circuit. Two miles of double circuit line no longer in use have been removed and 6.1 miles of single circuit line has been constructed double circuit. In addition to the above work on the 33,000-volt trunk system, 3.3 miles of single circuit peddler lines have been built and .4 mile of existing single circuit line has been reconstructed double circuit.

The work mentioned above has resulted in a net extension of the 33,000-volt system of 24 miles of lines, as compared with 32.3 miles shown in the previous report.

OVERHEAD LOW VOLTAGE SYSTEM

The continued growth of the City has demanded the extension of the low voltage system to meet the increased consumption of electricity for domestic, commercial and industrial use.

The increased load placed on many feeders has resulted in changing hundreds of transformers for transformers of greater capacity. New transformers have been installed and small transformers replaced with large ones, resulting in a net gain of 1021 transformers and 23,141 Kva. of capacity against a net gain of 1079 transformers and 20,662 Kva. of capacity for last year.

Three new feeder circuits of 2000 Kva. capacity and one of 1000 Kva. capacity were constructed in different sections of the City.

The secondary circuits of twelve feeders, which were cut over to 4600 volts, were rebuilt.

Two hundred and sixty-one minor rebuild authorizations, covering such work as transformer changes on account of overload and reconstruction to relieve low voltage conditions, were completed by this Division, compared with 392 completed during last year.

10,299 new poles were set, 293 of which were replacements, and 2282 poles were removed, resulting in a net gain of 7724 poles, as compared with 10,857 poles in 1928.

UNDERGROUND 33,000-VOLT SYSTEM

During the past year, 17,436 feet of conduit have been constructed for 33,000-volt cable, 24,238 feet of 33,000-volt cable installed and 14,937 feet removed, making a net gain for the year of 9301 feet.

UNDERGROUND LOW VOLTAGE SYSTEM

There was constructed 54,728 feet of conduit, 31 manholes and 19 transformer vaults for low voltage use in various parts of the City, including Hollywood and San Pedro.

There was installed during the year, 115 transformers having a capacity of 6785 Kva. and 34 transformers having a capacity of 1595 Kva. were removed, giving a net increase of 81 transformers and 5190 Kva. over the previous year.

The following cable was installed:

	No. Ft. Installed	No. Ft. Removed	No. Ft. Net Gain
Primary in Commercial Districts	61,302	7,064	54,238
Primary in Residential Districts	53,429	670	52,759
Secondary in Commercial Districts	21,585	7,870	13,715
Secondary in Residential Districts	76,922	2,780	74,142
Services in Commercial Districts	105,770	9,523	96,247
Services in Residential Districts	65,800	310	65,490
Pressure Cable and Phone Cable	16,233	0	16,233

STREET LIGHTING SYSTEM

During the last year, 313 street light authorizations were completed, adding the following street lights to the system:

Fifty-nine new ornamental systems were placed in service, consisting of:

3841 series incandescent lamps
4 multiple incandescent lamps

Seven hundred overhead lights were installed during the year and miscellaneous changes made in the system, making the total number of lamps as follows—

58,633 lamps—Ornamental lighting.
2,064 lamps—Parks, tunnels, bridges, etc.
8,186 lamps—Municipal overhead system.
3,224 lamps—Commercial overhead system.

In keeping up the maintenance on this large number of lights, several crews of lamp cleaners and trimmers are kept in the field all of the time. Also, due to the large number of metal ornamental posts, we keep a crew painting these posts; 1866 were painted during the year.

METERS

There has been installed during the year, 13,099 meters and 4700 meters were removed, making a net increase of 8399 meters.

TROUBLE

A complete organization for answering trouble calls is maintained.

Trouble dispatchers on duty all of the time at 220 South Hill Street, receive calls and transmit them to troublemen located in different parts of the city. The number of men kept on duty varies during different

parts of the day also during different times of the year. These troublemen answer all calls of lights out, including street lights, and answer all fire calls and complaints of wires down, etc.

Sales Division

BURDETT MOODY, Director

The extraordinary expansion in building activity up to three years ago, brought to the Department its characteristic problems, but the present lower building rate has permitted us, in the last two years, to concentrate more effectively on the promotion in the use of electrical energy by established consumers.

Throughout this last two years, our commercial and industrial consumers have been merchandising in a buyer's market with very close competition. Hence the special efforts of the Department to promote, through cooperation and advice, a more effective and economical use of electricity in business processes, has been productive of mutually beneficial results.

Furthermore, the two last rate reductions in the cost of electricity, have been of great assistance. Particularly has the domestic light and appliance rate broadened out the market for sale of electrical energy on the one hand, and raised the standard of health and living, with lessened cost to the consumers on the other.

Similarly, reduction in commercial power and light rates this year has offered wider opportunity to the merchants of Los Angeles to lower overhead costs and more economically extend the lighting use of energy to promote sales.

The close of this year brings to practical completion carefully laid plans devised for still further extending of effective cooperation between this Department and our many consumers, by means of trained qualified engineering specialists. All of our citizens will thus have precise first-hand knowledge of the many uses of electricity and its best adaptation to their needs in promoting economy and prosperity.

This is essentially promotional work, or merchandising in the broad definition of that term. To this we are devoting our serious efforts, believing no other policy is so well worth while. It has already yielded a definite measurable success. The plan and policy, if vigorously followed out, will set a new high mark in public utility service.

SPECIALIZED SERVICE TO CONSUMERS

In promoting the interest of both the consumer and the Department, four specialized engineering services have been fairly completely developed during the year, namely,

1. Illumination, including planning and design.
2. Commercial baking, cooking and similar apparatus.
3. Major (heavy duty) appliances, such as ranges, water heaters, space heaters.
4. Electrical heating for industrial processes.

A careful consideration of the policies of the Department with respect to this promotional work, will confirm the fact that it has substantially increased our gross, and in a larger degree, the net income of the Department. Moreover, this is entirely consistent with the interest and welfare of the consumer. This specialized service is in a way an extension of the Domestic Service work which has already proven its great worth to the Department, as evidenced by the Refrigeration Merchandising Campaign.

RESIDENCE LIGHTING AND APPLIANCE USE

Building activity in single family dwellings appears to about hold level with last year, having 4731 new applications calling for 7103 KW—estimated annual revenue of $135,413.00.

APARTMENTS AND COURTS

251 accounts were added, with 3731 KW of load, estimated annual revenue of $62,420.00.

COMMERCIAL LIGHTING

966 new customers have been acquired with 8037 KW of load, yielding an estimated annual revenue of $185,241.00.

COMMERCIAL AND INDUSTRIAL POWER

2615 contracts—39,238 H.P. and estimated annual revenue, $514,298.00.

MOTION PICTURE INDUSTRY

Additional capacity was provided for 470 KW of light and 4598 H.P. of power, with an estimated annual revenue of $66,135.00. Actual net connected load has increased 14.7 per cent, as of June 30, 1929, compared with a year ago. This phenomenal increase is directly due to the construction of "talkie" facilities. Sound-proof stages require elaborate ventilation equipment. Adequate lighting must be provided, as well as capacity for the reproducing equipment.

OIL PRODUCTION AND REFINING

Larger installations signed up totalled 4839 H.P. with estimated annual revenue of $74,945.00. The major portion of this business was for additional cracking plants. Most of the balance was for replacement of steam pumps with electric drive on oil pumps.

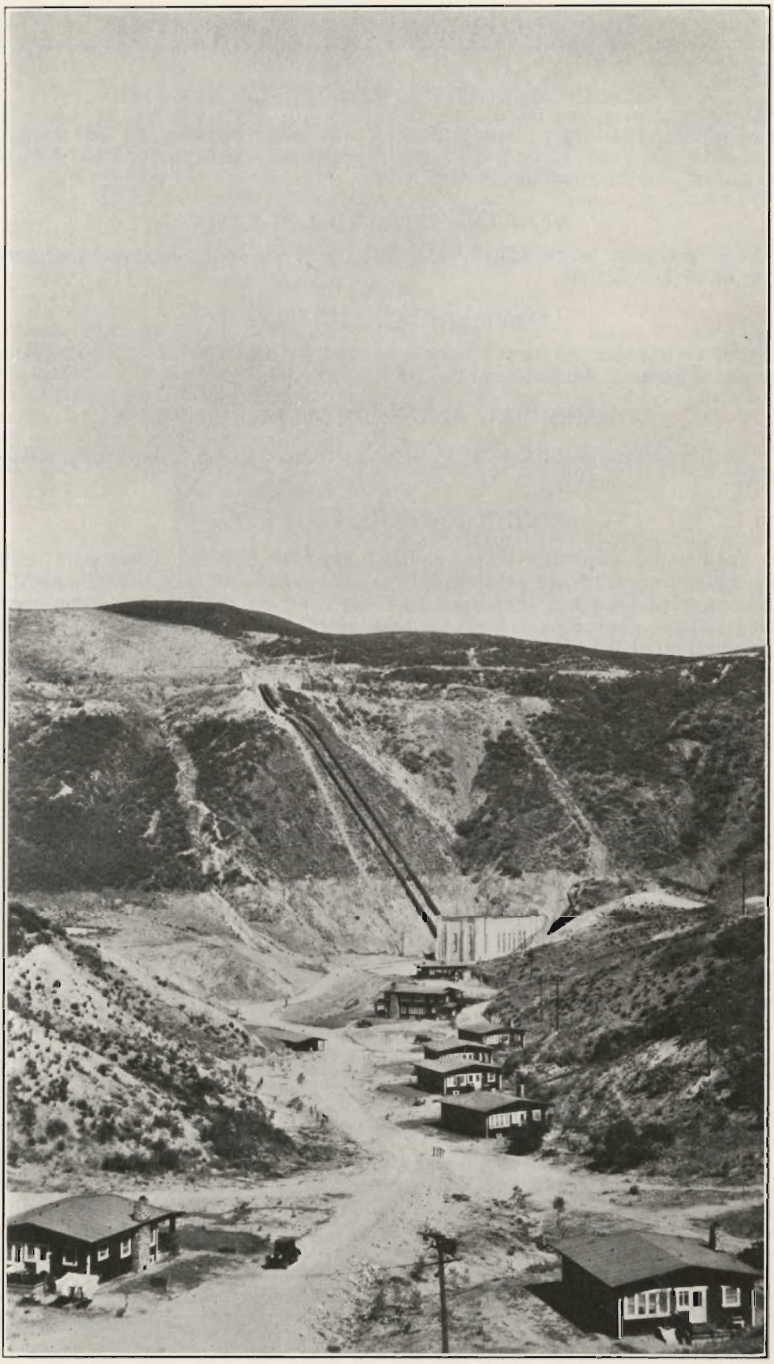
MISCELLANEOUS INDUSTRIAL BUSINESS SECURED

New rock crushers and additional load on existing installations amounted to 1388 H.P. Estimated annual revenue, $15,170.00. Borax plant, 400 H.P.—estimated annual revenue, $8,000.00. Bakeries, canning plants, brick plant, railroad shop, battery plant, meat packing plants, hosiery mill, furniture plants, and flooring and furniture plants, totalled 3218 H.P., and $52,757.00 in estimated annual revenue.

DEVELOPMENT OF THE APPLIANCE LOAD TO RESIDENCES AND APARTMENTS, INDUSTRIAL ELECTRIC HEATING IN FACTORIES, AND THE EXPANSION OF ILLUMINATING SERVICE TO NEW AND EXISTING CONSUMERS

(a) Appliances for Residence Consumers: The promotion of electric ranges, water heaters, space heating, to the domestic consumer was conducted by four men specializing on the work, three men on regular territories who devoted considerable of their time to the work. With the Domestic Service Section, they have obtained a splendid record resulting in an increase of 403 of this class of consumer added, with a connected load of 3577 KW. For the last fiscal year, the increase in number for this class of service was 29.6 per cent, representing a 40.1 per cent increase in load.

(b) Appliance Load in Apartments: The past year has seen considerable activity in this type of load building. The publication "Electricity in Modern Apartments" was issued in the fall of 1928, and has been a material asset in interesting the architects. The manufacturers'



SAN FRANCISQUITO POWER PLANT NO 2
General View Including Rebuilt Employees' Quarters, 1928

representatives have been vigorously covering the field with the result that their efforts are now bearing fruit.

For the year, there were 15 apartments that were equipped with some form of electrical heating or cooking appliance, detailed as follows:

321 Electric Ranges with a connected load of	2203½	KW
455 (1 to 1½ KW) Bathroom Heaters, with connected load of	543	KW
Three of these apartment homes were equipped with complete electric heating, with a load of	1318	KW
Total	4064½	KW

In addition, there were two apartment houses with 116 apartments wired for electric ranges. It is estimated that total kilowatt-hours for heating and cooking in these apartments will be 1,251,000, with an estimated revenue of $16,446.00.

(c) Industrial Heating in Factories: Approximately 811 kilowatts of heating load was added to our system producing an estimated annual revenue of $19,225.00. This load consisted of sterilizing, core baking, drying, and baking ovens, electric steel and brass furnaces, and miscellaneous special furnaces and heating equipment for newspaper plants.

A specialist was sent to Detroit and Cleveland to attend the Industrial Heating School sponsored by the National Electric Light Association. He received instruction and advice on the new application of electric heating to various classes of industries. The benefits of his instruction are now available to the industries of Los Angeles.

(d) Illuminating Engineering Service: The Illuminating Engineers prepared 206 complete recommendations for consumers and prospective consumers. These recommendations totalled 10,820 outlets of 2261.04 KW. It is estimated that this effort has resulted in an increase of approximately 1100 KW in connected lighting load, with an estimated annual increase in revenue of $22,000.00.

In addition to the above, 35 demonstrations were made on consumers' premises.

This service has proven of considerable advantage to the Department in furthering our closer relations with the architects and engineers of the City. Many of the prominent organizations in this profession accept our engineering advice on their illuminating engineering problems.

DOMESTIC SERVICE SECTION AND APPLIANCE ROOM

This fiscal year has been the most active up to the present time since the Appliance Room has been opened. This is due without question to the merchandising advertising efforts directed toward carrying out the largest endeavor of its sort heretofore undertaken anywhere. The Department initiated a cooperative merchandising campaign, having for its purpose installation and use of electric refrigerators on our lines. This merchandising and advertising campaign was participated in by all of the national manufacturers of refrigerators, together with large department stores and other local merchants.

It is conceded that this was the first attempt of its kind, and was noteworthy for its success. Recognition was accorded by the local Pacific Coast advertising agencies, by giving this merchandising plan first place in their awards.

The close of our fiscal year found it too early in the season to predict the ultimate effect, but without question it has met with public commendation.

A new exhibit has been installed in the Appliance Display Room, of a completely equipped electrically-operated commercial cooking unit. As a result of this demonstration, we have been able to install various pieces of equipment in some of the leading restaurants in Los Angeles.

Cooking classes have been carried on as usual, as well as show windows and displays, range repair service, and other activities. The following, set up in tabulated form, affords further information:

Total number of ranges installed	309	2306.79 KW
Total number of water heaters installed	106	362.3 KW
Total number of space heaters installed		594.6 KW
Total kilowatts connected		3263.69 KW
Total attendance, all cooking classes		13,272
Number of dinners—17—attendance		1,030

ADMINISTRATION OF LINE EXTENSIONS ACCOUNTING—NEW SUBDIVISIONS

During the year, the Sales Division initiated 1566 authorizations (cancelled authorizations omitted) for new extensions or for load on consumers' premises. Of this number, 105 were to serve new tracts or plots of land, located:

Los Angeles District	19
San Fernado District	52
San Pedro District	8
Sawtelle District	26
Total	105

Commercial Division

C. K. CHAPIN, Director

The character and volume of city growth as shown in our consumers' records prove we are growing as a more perfectly balanced metropolitan community than ever before. Increases in Commercial and Industrial business, together with a very pronounced improvement in the related credit transactions, show sound expansion and conservative management in this expansion.

The records of our vacant property and the new services installed for homes and apartments would indicate, beyond doubt, that another upward turn in growth has taken place during the year just closed. Notable examples for this growth in certain large sections of the City are: Hollywood, where the last year's business increase was more than 25 per cent; and West Los Angeles, where the increase was in excess of 20 per cent. The significance of this is far-reaching, because for the last five consecutive years, the rate of growth, considering the City as a whole, has been slowing up, year by year. The next five-year period, 1930-1935, considering the stimulating influence to be anticipated from great economic factors in this section of the country, would seem to indicate the necessity for great expansion provisions in all directions.

The Commercial Division is prepared to handle this growth without impaired efficiency or increased cost per unit of work done. On the contrary, the indications at this time are that better service and increased efficiency will be attained by this Division.

Experimental development in handling of Commercial Division records of electricity and water sold, has warranted a complete change in the method of billing and record-keeping of accounts. Certain advantages are gained for the present by this change and these advantages will be cumulative as the system grows from year to year, making it possible to successfully cope with the future problem of handling a million or more separate water and light accounts, where now it is approximately one-half million.

The traffic problem which attracts universal attention because it affects the entire city, has its reflection in our regular monthly contacts with consumers. Through cooperative studies between large mercantile establishments, the Government Mail Service, banking institutions, and others, we have improved our service where the consumers use the mails to transact business in paying bills, etc. This is saving the public and the department much time and annoyance and holds additional promises for the future. We are now handling over one-half million pieces of incoming and outgoing mail each month.

There is much satisfaction to be gained from the records of court, bankruptcy, foreclosure, and receivership losses, insofar as they affect the Department financially. Our endeavor to cooperate with our consumers when undergoing trying credit disturbance—usually brings good final results and every effort is made to minimize the necessity for legal means to protect the public interest in the Department's business dealings.

During the past fiscal year, certain well-defined commercial activities in Owens Valley were transferred to the Commercial Division, more particularly the billing and collecting of all light and power sales in the City's electric system in the Valley, and in addition, the collection of regular rentals on leases of ranch and town property owned by the City of Los Angeles.

Many studies to determine the extent and desirable solution of important problems in the Commercial Division are under way at this time.

Among them might be mentioned future additional branch offices in outlying sections of the City. This problem is complex in its character and has not progressed sufficiently at this time to be in the Budget for the fiscal year 1929-1930. Another important problem is connected with the closing of accounts for electricity and water at the time of moving from one location to another in the city, or perhaps leaving the city. We are called upon to make approximately 125,000 closing bills by reading the meters and bringing forward the accounts in our consumers' records and then endeavor to contact the former consumer by mail or in person, in order that they may make the payments due.

It is believed that during the coming year, this constant problem can be solved to a much greater degree than at the present, and as the City's growth continues the necessity for extreme care, efficiency and speed on such transactions becomes more evident.

Cost Division

M. P. LEWIS, Engineer

The activities of the Cost Division for the fiscal year 1928-1929, were broadened somewhat as compared to previous years.

In the preparation of the Annual Budget, preliminary studies were made approximately four months prior to the closing of the fiscal year, anticipating the current expenditures for operation and maintenance for the ensuing year. Each of the several divisions provide the management with estimates of the expenditures which will be necessary for the year. These divisional estimates are assembled in the Cost Division, analyzed, and recommendations made to the management. Concurrently with the preparation of the expense budget, revenue studies are made to predict the estimated revenue to be derived from the sale of water and electric energy and other sources. Programs are also prepared for the capital expenditures that have been outlined for the current year, from 1925 and 1926 water department bonds and the 1924 and 1926 electric bonds, as well as those contemplated from water and power revenue funds.

A monthly report was made of the current expenditures to each item of the capital and expense budget to the various divisions. This report was supplemented by graphic charts showing the condition of each budget item or each fund, for the month.

During the last few months of the previous fiscal year, an analysis was made of the standard classification of accounts, as prescribed by the California Railroad Commission in 1923, by other State commissions, and the National Association of Railway and Utilities Commissioners, with the idea in view of classifying the system of accounts in use by the Power System. Upon the adoption of these accounts, July 1, 1928, an analysis was made of all the charges that had been made against our previous system of accounts since the origin of the Power System. Upon the completion of this study, the capital accounts were adjusted to conform to the new classification of accounts.

During the past fiscal year, a decided improvement was made in the mechanical cost keeping procedure for the water works system. This was accomplished by changing the set-up in our machines after a study of a period of approximately three years. This enables us to standardize on all forms used in posting costs.

During the latter part of the fiscal year, a physical inventory and valuation was made of all the ranch property which has been acquired in Owens Valley. Photographs were made of all the structures and floor plans outlined of all the principal buildings. This record is kept up to date by the addition of new purchases, and also upon the retiring of any ranch property. The old system of ranch names is being superseded as quickly as possible with a ranch number. This ranch number will indentify the property as to township, range and section. This work was partially completed at the close of the fiscal year.

A physical inventory of all the properties of the Owens Valley Light and Power System is being made. This is for the purpose of straightening out the Owens Valley Light and Power accounts, and taking out of land capital and source of water supply capital, all electric lines and fixtures that are now shown in these accounts, and transferring them to the accounts of the Owens Valley Light and Power System. This valuation will afford a basis upon which to transfer this property from the water works system to the Power System at any time that seems advisable. Field work on this inventory was well along at the close of the fiscal year.

An appraisal was made of all the properties that had been purchased along the proposed transmission loop line of the Power System, and values set up for the structures separate from the value of the land. This is to be kept up to date as new purchases are made or sales consummated.

A complete record has been kept up to date of all the structures and equipment within structures, upon the Power and Water Works System of the Department, at least once during the year on the Water Works System and twice during the year on the Power System. An inspection was made of all pumping plants, substations and power plants, including a check of all the recordable equipment contained in these structures, both by property number and serial number. All new structures and equipment built or purchased are added to these records at the time of the periodical check. Separate authorizations were issued as fire losses occurred, and charges were accumulated, constituting a definite insurance record.

This division made its annual investigation into values for property retired. This report is furnished to the General Warehouse and establishes the values at which street mains, transformers, poles, etc., are to be taken back into the warehouse stock when recovered from the system or when retired. This investigation also included the establishment of the value of the labor cost of installation which is written off

on the retirement of any property. The tabulation of all of these unit retirement values is furnished to the Accounting Division for application to the warehouse value of recovered material, in order to remove from capital accounts the cost of installation. On the Water Works System, items of any magnitude other than street mains, are retired at actual cost.

A number of studies were made and exhibits prepared, therefrom, for presentation at the hearings of the California Railroad Commission in the condemnation of portions of the Southern California Edison Company's electric distributing system lying within those areas annexed to the city since 1922.

Special reports were made covering the status of various projects, analyses of project costs, and other studies of a similar nature. Construction costs and unit costs are kept on all jobs done by the water works system and these are sent out to the engineer in charge of the project or work, each month, as the work is carried on, and a final report at the completion of the job. Special reports are made up as the work progresses, for each Municipal Improvement District fund, showing either individual costs or project costs.

At the close of each year, a detailed report is compiled for each individual piece of equipment and car used in the water works system. A similar report is made for equipment and cars used by the Colorado River section.

The timekeeping section of the water works system cares for an average of approximately 2500 men in the preparation of semi-monthly time rolls. Entries are made from approximately 900,000 daily time cards, during the year. In the Power System the timekeeping section cares for an average of 2200 men and recorded data from over 820,000 time cards. Due to the change in working rules which became effective November 1, 1928, approximately 1600 forms for change in salary and classification were prepared. This was in addition to the changes coming through each period, which have not been estimated. During the year 78,506 foreman's daily reports were handled. These were rated, priced, extended, audited and a recapitulation made to accounts.

Investigations were made from time to time, and upon request, into the economic condition of the Department, City, County, Metropolitan Water District, Coastal Plain, and Southwestern United States. These investigations covered the effects of the various phases of growth, actual and anticipated, distribution of the use of water and electric energy, and the output of manufacturers and the products of agriculture in the territory under consideration.

Several papers were prepared for presentation to engineering and educational groups during the year.

Personnel and Efficiency Division

C. A. DYKSTRA, Director

Personnel work in modern industry is one arm of administrative organizations for studying men and women and their relation to industry and employment. This function includes an attempt to discover human needs and possible ways of meeting them. It assumes that human beings are as necessary to modern life as are machines and processes. It realizes that in a day of mass production and machine economy, it is sometimes necessary to rediscover man.

The Department of Water and Power is quite aware of this human problem and is bending its energies to fully appreciate it. It is doing its best to be honest and honorable in dealing with men and women in this branch of the municipal service, and the Personnel Division in cooperation with the general executives of the Department and the Employees' Association is striving earnestly to meet intelligently the human situations which appear from time to time within the Department.

APPOINTMENTS AND TERMINATIONS

This division handles only such appointments and terminations as come within the jurisdiction of the municipal civil service list. The following figures for the year indicate that there were thirty-five fewer appointments to permanent positions under regular Civil Service positions than there were terminations. There were fourteen discharges of employees, all of which were upheld by the Civil Service Commission, and nine transfers to other City departments. The volume of employment activities of the division is indicated in the following table:

Terminations:		
Resignations and Lay-Offs for lack of work	628	
Discharges	14	
Transfers to other City Departments	9	
Total number of terminations	651	651
Appointments:		
Permanent transfers from City departments	3	
Temporary and Emergency Appointments made permanent	155	
Permanent Appointments	458	
Total number of Permanent Appointments	616	616
Changes in classifications	165	
Vacation relief and temporary Appointments	74	
Total number of all Appointments	855	35

During the year the Civil Service Commission certified to this Department a total of 1937 persons for interview and possible appointment. Of this number, 855 received appointments, and of these 616 to permanent positions. The following table gives further detail on the subject:

Reports on Certifications:	
Declined	471
Failed to report	298
Not selected	313
Appointed	855
Total certified	1937
Certifications cancelled	41
Leaves of absence granted	727
Leaves of absence cancelled	25

It should not be out of place to suggest at this point that the Department has received the most whole-hearted cooperation of the Civil Service authorities in its employment problems. The staff of the Commission and the Commission itself, have been most anxious at all times to investigate and comprehend the particular nature of this Department's problems. They have provided us with fair and intelligent examinations and given us lists of a high calibre. Furthermore, they have done everything possible to meet our special problems as they have come up. In several cases, they have given their examinations in the Owens Valley and in one case sent questions to Washington, D. C., because one of our emergency men was on duty there for the Department.

SERVICE RATINGS

This aid has been given freely by our municipal personnel agency in the Department's rating problem. During the past year, one of the divisions of the Department has been the Pacific Coast laboratory for

the trying out of a new system of rating, the so-called "Probst" system. It is quite possible that this experience will result in making this system a City-wide system. Our experiments in this rating field indicate that our Department raters are on the way to real progress. It is to be hoped that next year's report will indicate that after several years of trial and error, we have at last worked out a reliable method of rating, which will be controlling in question of promotion and increases in pay.

VISITING AND EMERGENCY NURSE SERVICE

The Department's visiting nurse has had a busy year. She has supervised the rest period of from thirty to sixty employees per day in the Department rest rooms. By this device, many who would otherwise have gone home ill and lost a day of service to the Department, have been given emergency treatment and an hour or two of rest and been returned refreshed and inspirited to their desks. Just what this means in time and money saved, it is needless to calculate, but it has meant much to hundreds of employees in comfort and in peace of mind.

The nurse has made hundreds of calls at employees' homes both for emergency and welfare purposes. She has covered the City from San Fernando to San Pedro. The list of dressings applied and cases treated in her office, seems unbelievably large, but the records speak for themselves. During the periods of the year when the 'flu" is upon us, she is particularly busy treating noses and throats. It should be further noted that she has been able to discover many ailments in their incipiency and do a valiant service thereby to many.

WELFARE SERVICES

The Personnel Division for some years, has undertaken the responsibility of providing administrative aid to the Employees' Association in some of its activities. Mr. Dan S. Parkes was transferred from the Accounting Division to the Personnel Division, to aid in the administration of some of the current welfare work and undertake certain new welfare services, such as insurance, income tax and pension studies. Since the welfare work of the Department is in part that undertaken by the Employees' Association, and in part by the Personnel Division, any report on such activities must, in a sense, be joint. Without attempting to differentiate or to add or subtract in this field, perhaps it is enough to say that the Employees' Association, together with the Personnel Division, have developed a fairly comprehensive program of welfare activity.

This program has been so successfully planned and executed that other branches of the City government and private corporations, as well, are emulating certain portions of this work. The benefits accruing to the Department because of these services are intangible and, therefore, hard to appraise. However, it is fair to say that the general impression given by supervisors in most of our divisions, indicates that the morale and effectiveness of the Department's personnel has been appreciably raised because of the so-called welfare activities.

The Relief and Benefit work of the Employees' Association, and the staff of the Personnel Division, together with the group medical service, have brought to the attention of the Department many employees' problems of a personal and private nature, and without question many of these difficulties have been solved to the satisfaction of the interested persons. The confidence that is built up in the employees because of these services, is invaluable and the result is of great benefit to the Department. During the last year, this relief committee has expended in relief and in loans more than $10,000.00, all of it from employee funds.

Active agencies fostered and developed by the Employees' Association with the aid of the Personnel Division, are five in number:

1. Group Life Insurance
2. Group Auto Insurance
3. Group Medical, Surgical and Hospital Service
4. Group Finance
5. Group Income Tax Work

LIFE INSURANCE

The group life insurance has been in effect since May 2nd, 1927, and it has weathered the storm of nearly a hundred family tragedies in a most comforting manner. Fortunately for the employees of the Department, this service rather than the old mortuary service, was in effect at the time of the St. Francis disaster. All claims were paid promptly and cheerfully by the company with which the Department employees are dealing. The following figures give a brief picture of our group life insurance to date:

Original Members	3285
New Members	821
Deaths	79
Total and Permanent Disability	8
Terminations	962
Certificates in Force this date	3059

There has been no change in the rate paid by employees since the inception of the group plan. It remains $2.25 per month for a policy with the face value of $2,500.00.

AUTO INSURANCE

The group auto insurance program has saved the personnel of this Department time, effort and expense. At the present moment, a total of 550 cars are insured in the group. New applications are made daily. Since this service became effective last October, 68 claims have been filed—claims covering every type of automobile insurance. To date, no claims have been protested or denied by the company, and in numerous instances they have aided in securing settlements for the employees, even when that company had no liability whatsoever.

MEDICAL SERVICE

The medical service handled under contract with the Ross-Loos Clinic, has proved to be of immense benefit to the personnel of the Department. It has been in operation only three months, but the advantage of this group service has already proved itself many times over. For $1.50 per month, the employees of this Department are receiving full medical, surgical and hospital service for themselves and medical and surgical attention for their families, as well. In the three months of operation of this service, thousands of our employees and their dependents have received medical and surgical attention and have been rehabilitated and restored to usefulness to the community and to the Department.

The Doctors report that most of the work performed in their clinic, to date, has had to be with chronic conditions and physical imperfections that have been neglected, some for protracted periods. It appears that the chief cause of this condition of marked neglect has been due not so much to carelessness on the part of the individual, as to financial inability to obtain needed treatment. In the three months just passed,

the doctors' report reveals the following statistics from 2000 employees included at the present time in this service:

Number of office visits	4889
Number of house calls	465
Number of operations	201
Ex-Rays taken	313
Ex-Ray treatments	25
Confinement Cases	6

GROUP FINANCE

The Group Finance work of the Department is organized under the state law which incorporates municipal credit unions. The purpose of the law is to aid in the elimination of the activities of so-called "loan sharks." Employees of other city departments are enrolled as members of this Union, but to date the larger portion of the business conducted by the Union has been with the employees of the Department of Water and Power. The Union is operated by a salaried manager. To date, the Union has assets of $60,000.00 and has made 750 loans, totalling $68,000.00.

INCOME TAX

The employees income tax work is a continuation of activities begun at the time that the Internal Revenue Department of the Federal Government handed down the decision which compels employees of revenue producing municipal services to pay a normal Federal income tax. This Department has worked with the Western Municipal Employees' Association and the American Water Works Association, in an endeavor to bring about a fair solution of the problem raised by the taxing of one group of municipal employees and exempting others.

PENSION SYSTEM

Preliminary studies have been under way in this division, for several months, for the purpose of finding a possible tentative basis for a contributory pension retirement system within the Department of Water and Power. This study has reached the point where it has become necessary to compile an almost infinite number of figures, together with thousands of calculations, in order to predetermine the results which such a pension system will experience at its initiation, and in ten, fifteen and twenty-year periods. Viewed in the light of the experience of the former city pension committee, the progress seems quite satisfactory. It has been made at a negligible cost and with the Department needs in mind. It is to be hoped that a thoroughly considered plan of retirement for this Department can be submitted to the Department of Water and Power Commissioners, at a comparatively early date.

EMPLOYEES' EDUCATION PROGRAM

The program of educational activities carried on by the Personnel Division in the years 1926, 1927 and 1928, was dropped during the year just closed, because of the understanding of this division that a city-wide program was in process of organization for the years 1928 and 1929. During that year, however, the University of Southern California announced its school of citizenship and administration and took into its staff that number of Civil Service Commission's personnel who were working on the program. It has seemed wise to watch this educational endeavor of the University carefully, with the hope that it will provide such educational opportunities as the employees of this Department may desire. In the event that the experiment does not seem to meet the needs of this Department, the question of its own educational program will be re-opened and reconsidered.

Purchasing Division

D. P. NICKLIN, Director

During the fiscal year 1928-29, the volume of purchases declined considerably, as compared with the two preceding years. Total purchases amounted to $6,377,360.17, as compared to $9,057,050.84 for the fiscal year 1927-28. Several different conditions contributed to this decline, of which the foremost was a temporary lull in construction work. The decrease is also accounted for in part by the entering into of many term contracts for standard materials, in lieu of purchasing on a hand-to-mouth basis. Further reductions were made by establishing storekeepers' trust funds enabling storekeepers to make all purchases of $5.00 or less, from this fund, rather than ordering their requirements through the Purchasing Agent. A further cause for the reduction of work in the Purchasing Division was the issuance of blanket orders in favor of various Divisions, Sections and individuals of the Department, authorizing them to make purchase of $25.00 or less, but not exceeding a total of $500.00 in any one calendar month. Due to the changes enumerated above, the working personnel of the Division was reduced by 33-1/3 per cent.

TRAFFIC

At the beginning of the fiscal year, the Traffic Section was transferred from the Accounting Division to the Purchasing Division. This section is responsible for all matters pertaining to transportation by a common carrier. Material savings have been effected through consolidation of shipments, the use of package cars, etc.

PURCHASES

The Purchasing Section has continued during the past year, to make further progress looking toward a complete standardization of all materials carried in warehouse stock.

During the year, there were 566 standard specifications written and adopted. Two standard committees were formed during the year; one to establish standard office supplies, and the other to standardize all forms used by the Department. These committees have functioned very satisfactorily, being of great assistance in furthering of standards.

The group handling purchases involving amounts in excess of $2,000.00, prepared and advertised 210 Notices Inviting Proposals and recommended to the Board of Water and Power Commissioners, the award of 240 contracts involving a total estimated amount of $3,144,-746.55. This group also prepared and issued 1321 blanket orders and term contracts.

The group handling purchases of $2,000.00 or less, received 7511 requisitions, sent out 5388 sets of Requests for Bids and issued 9946 purchase orders, of which 2984 were for emergency purchases.

From the Storekeepers' Trust Funds, there were made 5890 purchases of $5.00 or less, each. These funds are limited to purchases of materials and supplies that are not items of stock, nor items of standard materials. These purchases eliminated the necessity of issuing a like number of requisitions, purchase orders and demands, as well as eliminating the handling and auditing of a like number of invoices. The total purchases made from these funds amounted to $10,988.22, an average of $1.86 per purchase, an amount far less than it would have cost the Department to put a like purchase through from requisition to demand.

OFFICE SUPPLIES

The Office Supply Section report for the past year, it is felt, is quite satisfactory. Not only has the volume of business kept pace with that of preceding years, but the turn-over of stock has been greater than

heretofore, and the expense of operation has been materially decreased. The average monthly stock on hand has amounted to $31,814.79, and the monthly issues to $24,549.12, or 9.2 turn-overs for the year. The pay roll has been reduced from $1,655.97 per month to $904.71, a reduction of 45.4 per cent. This reduction in expense is attributable in part to two methods adopted during the year. First, the standardizing of all office supplies and stationery, enabling the Purchasing Division to enter into many term contracts obviating the necessity of carrying such a large stock on the shelves, as heretofore; and second, the adoption of stock records using punched cards and tabulating equipment. The use of this equipment has not only decreased the cost of operation, but has enabled the monthly reports to be completed on the first day of the following month, where formerly they were not completed until the tenth of the month.

PRINTING

The output of the Printing Section was increased materially during the past year. A total of 1334 job orders were issued, making a total of 10,726,656 impressions. The operating expense amounted to $6,825.44, a unit price of $0.6522 per thousand impressions. This volume required the addition of one multigraph machine and one operator.

The Salvage Sales Section completed eighty-two sales of junked material and equipment, amounting to $66,261.40.

Right of Way and Land Division

JOHN T. MARTIN, Director

Sixty-six parcels of land, costing $1,288,006.77, were purchased during the year for use in connection with the Water Works System. Most of these purchases were in the Owens Valley, in connection with the development of the City's water supply system.

Thirty-one parcels of land were purchased for use in connection with the Power System, at a total price of $370,669.96. Most of these purchases were in connection with rights-of-way for the loop transmission line running from Receiving Station "A" in the vicinity of North Main Street and the Los Angeles River to the Harbor District.

In addition, Government scrip for 4,130.36 acres of land was purchased. Thirty-one entries have been made of the open land in Owens Valley, using 2,606.88 acres of the above scrip. The remainder is being held for application to other lands which may be required in the future.

In connection with the operation of the farm land in Owens Valley, 269 leases on the property have been made during the year.

Ninety-seven leases for houses, involving total rental of $52,726.39, were made. These houses were purchased in connection with the loop line transmission line.

INVESTIGATION OF ACCIDENTS AND ADJUSTMENT OF DAMAGES

In the course of a year's operation of a system, as large as that of this Department, there occur many accidents to the Department's property, accidents to automobiles owned by the Department and personal injury accidents.

A total of 2462 of such accidents occurred during the year. In some of these, employees of the Department are involved; in many, outsiders only, are involved. Classified, they are as follows:

Fire hydrants damaged	184
Automobile accidents	564
Unclassified accidents	198
Power lines and posts, etc.	267
Personal injury to outside parties	32
Personal injury to employees	1217
Total	2462

Following investigations made by this Division, damages were collected from outside parties in 281 cases. Damages were paid by the Department in 150 cases.

Where an employee of the Department is involved in an accident, involving property damage or personal injury, an investigation is made by this Division. If it appears that the employee is in any way at fault, the complete report is forwarded to the General Manager for consideration.

After consultation between the General Manager and the Division Head of the particular employee involved, decision is reached as to whether or not the employee should be required to reimburse the Department for any or all of the expense in connection with the accident under consideration.

All employees of this Department come under the provision of the Workmen's Compensation Insurance and Safety Act. Of the 1217 personal injury cases during the year, eight resulted in deaths, 286 were paid compensation insurance, and 1116 were given medical treatment.

The total expense for personal injury cases amounted to $119,990.79, divided as follows:

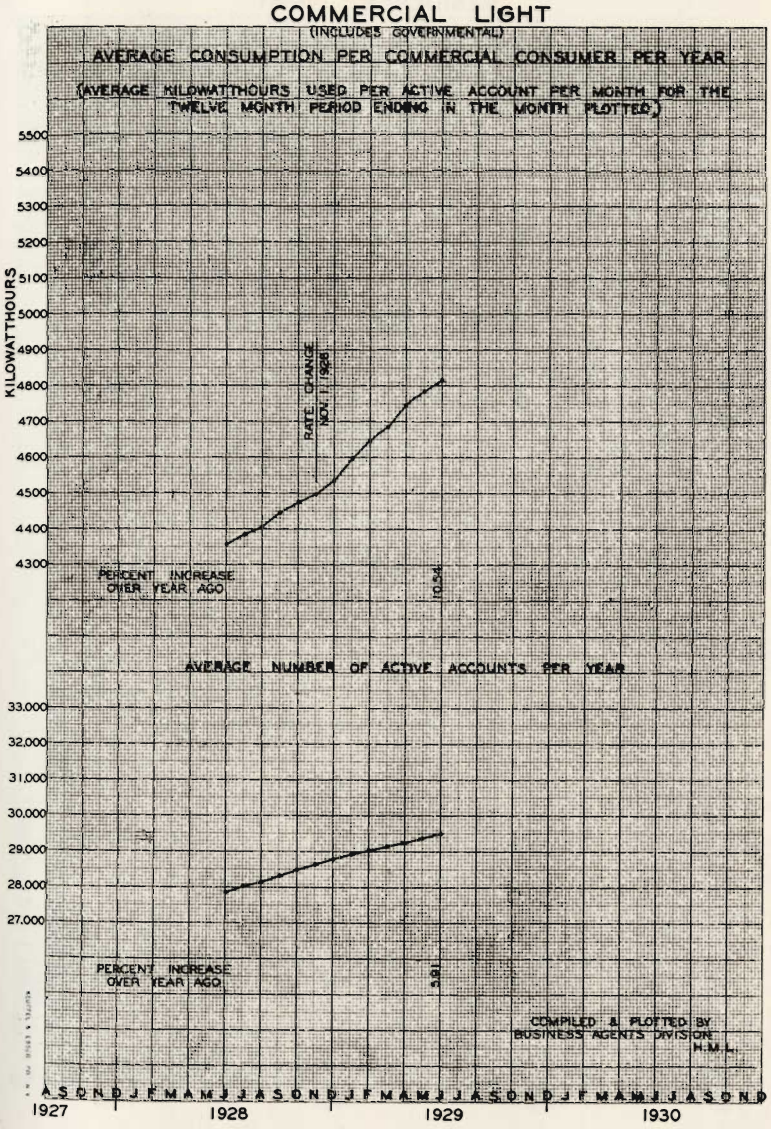
Medical Expense	$ 44,087.98
Compensation Insurance	74,802.07
Miscellaneous Expense	1,100.74
Total	$119,990.79

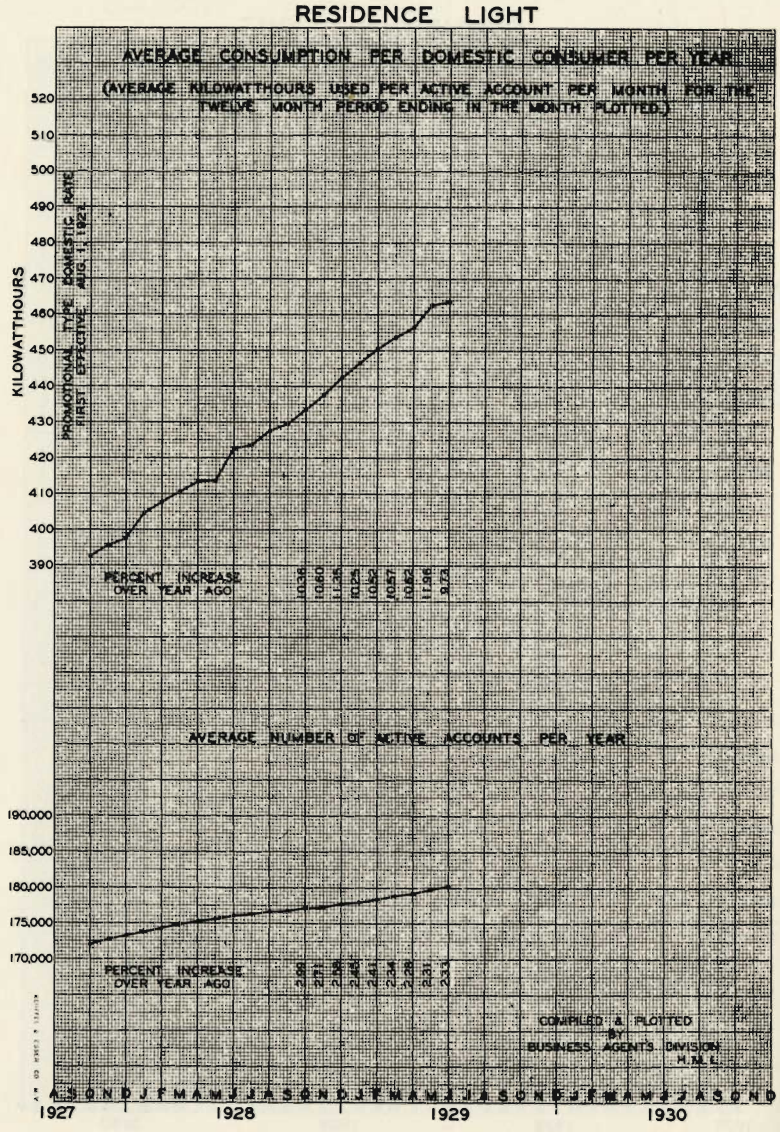
Respectfully submitted,

H. A. VAN NORMAN,
General Manager and Chief Engineer.

EXHIBIT "A"
DEPARTMENT OF WATER AND POWER
OPERATING DIVISION
REPORT OF SYSTEM OPERATION FOR FISCAL YEAR 1928-1929

MONTH	GENERATION—MUNICIPAL SYSTEM								PURCHASED ENERGY			GRAND TOTAL	TOTAL RECEIVING STATION ENERGY		
	San Francisquito P. P. No. 1 Kw-h.	San Francisquito P. P. No. 2 Kw-h.	San Fernando P. P. No. 3 Kw-h.	River P. P. No. 4 Kw-h.	Franklin P. P. No. 5 Kw-h.	Total Kw-h.	Peak Kw.	L. F. %	Kw-h.	Peak Kw.	L. F. %	Kw-h.	Kw-h.	Peak Kw.	L. F. %
July, 1928	14,486,400	9,045,000	3,561,000	99,200	654,000	27,845,600	59,600	62.8	22,462,224	63,792	47.1	50,307,824	48,217,182	119,200	54.4
Aug. 1928	14,656,100	9,273,000	3,668,000	.....	630,000	28,227,100	59,200	64.1	25,092,315	65,520	51.3	53,319,415	51,647,996	122,300	56.8
Sept. 1928	10,764,200	6,817,000	2,501,000	.....	604,000	20,686,200	59,300	48.5	31,085,582	74,304	57.9	51,771,782	50,446,181	131,900	53.1
Oct. 1928	9,499,400	6,059,900	2,246,000	.....	546,000	18,351,300	59,600	41.4	40,497,779	88,992	61.1	58,849,079	57,649,991	143,000	54.2
Nov. 1928	8,458,500	5,076,000	2,050,000	216,100	496,000	16,296,600	71,100	31.9	40,880,462	78,288	72.4	57,177,062	55,965,814	149,100	52.1
Dec. 1928	10,715,500	6,285,000	2,666,000	787,500	677,000	21,131,000	76,300	37.2	38,254,839	87,024	59.0	59,385,839	58,456,851	153,200	51.2
Jan. 1929	9,037,300	4,849,000	2,150,000	154,200	693,000	16,883,500	86,200	26.3	45,326,169	79,680	76.3	62,209,669	60,710,416	148,800	54.8
Feb. 1929	7,607,000	4,293,000	1,690,000	556,100	642,000	14,788,100	75,900	29.0	40,347,885	72,576	82.6	55,135,985	54,223,326	143,300	56.3
Mar. 1929	9,032,800	5,140,000	2,222,000	2,100	719,000	17,115,900	81,700	28.2	42,244,429	70,848	80.0	59,360,329	57,911,524	142,000	54.8
Apr. 1929	8,401,200	4,841,000	1,928,000	.....	541,000	15,711,200	79,600	27.4	40,878,244	69,312	81.8	56,589,444	54,937,114	140,700	54.2
May 1929	13,322,100	7,707,000	3,104,000	.....	754,000	24,887,100	83,900	39.9	33,428,333	62,160	72.1	58,315,433	55,777,763	136,800	54.8
June 1929	13,857,400	8,167,000	3,232,000	.....	728,000	25,984,400	79,700	45.3	30,081,873	62,112	67.3	56,066,273	54,180,843	134,300	55.8
TOTAL 1928-1929	129,837,900	77,552,900	31,018,000	1,815,200	7,684,000	247,908,000	86,200	32.8	430,580,134	88,992	55.2	678,488,134	660,125,001	153,200	49.2


COMMERCIAL LIGHT
(INCLUDES GOVERNMENTAL)
AVERAGE CONSUMPTION PER COMMERCIAL CONSUMER PER YEAR
(AVERAGE KILOWATTHOURS USED PER ACTIVE ACCOUNT PER MONTH FOR THE TWELVE MONTH PERIOD ENDING IN THE MONTH PLOTTED)
KILOWATTHOURS
5500
5400
5300
5200
5100
5000
4900
4800
4700
4600
4500
4400
4300
RATE CHANGE NOV. 1, 1928
PERCENT INCREASE OVER YEAR AGO
10.5+
AVERAGE NUMBER OF ACTIVE ACCOUNTS PER YEAR
33,000
32,000
31,000
30,000
29,000
28,000
27,000
PERCENT INCREASE OVER YEAR AGO
5.8+
COMPILED & PLOTTED BY BUSINESS AGENTS DIVISION H.M.L.
A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927
1928
1929
1930


RESIDENCE LIGHT
AVERAGE CONSUMPTION PER DOMESTIC CONSUMER PER YEAR
(AVERAGE KILOWATTHOURS USED PER ACTIVE ACCOUNT PER MONTH FOR THE TWELVE MONTH PERIOD ENDING IN THE MONTH PLOTTED.)
KILOWATTHOURS
520
510
500
490
480
470
460
450
440
430
420
410
400
390
PROMOTIONAL TYPE DOMESTIC RATE FIRST EFFECTIVE AUG. 1, 1924
PERCENT INCREASE OVER YEAR AGO
10.36
10.80
11.36
10.25
10.80
10.57
10.82
11.96
9.73
AVERAGE NUMBER OF ACTIVE ACCOUNTS PER YEAR
190,000
185,000
180,000
175,000
170,000
PERCENT INCREASE OVER YEAR AGO
2.68
2.71
2.76
2.48
2.61
2.54
2.28
2.31
2.33
COMPILED & PLOTTED BY BUSINESS AGENTS DIVISION M.T.&L.
A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1927
1928
1929
1930

DEPARTMENT OF WATER AND POWER, WATER SYSTEM

STATEMENT OF WAREHOUSE TRANSACTIONS—FISCAL YEAR 1928–1929

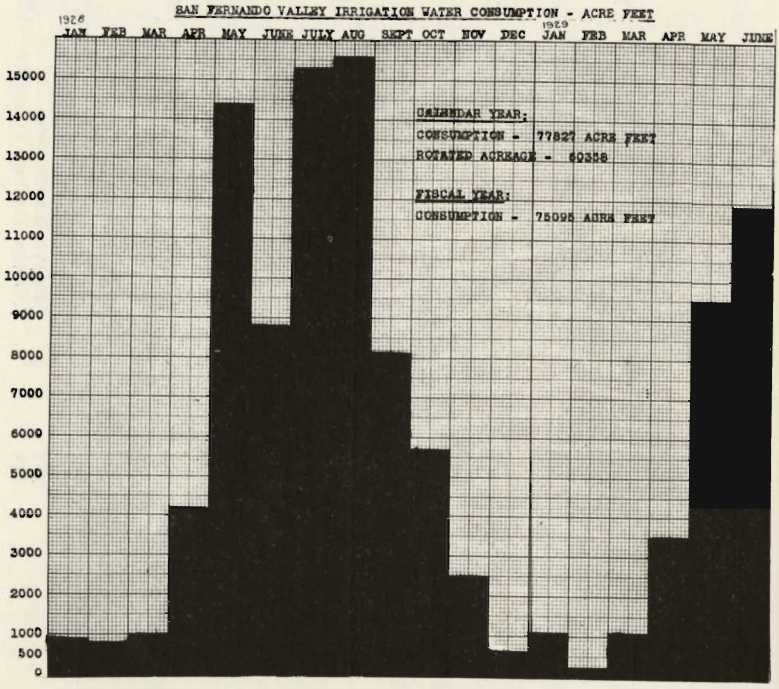
Warehouse	Stock on Hand 6–30–28	Receipts Fiscal Year 1928–1929	Total Receipts Plus Prior Balance	Issues Fiscal Year 1928–1929	Stock on Hand 6–30–29
General Warehouse	824,579.70	1,684,634.61	2,509,214.31	1,815,493.31	693,721.00
Independence Warehouse	287,270.29	240,522.60	527,792.89	299,884.95	227,907.94
Van Nuys Warehouse	196,002.97	424,036.18	620,039.15	464,299.74	155,739.41
Mojave Warehouse	16,991.34	15,884.51	32,875.85	22,642.73	10,233.12
San Pedro Warehouse	52,051.99	223,516.85	275,568.84	233,159.27	42,409.57
TOTAL	1,376,896.29	2,588,594.75	3,965,491.04	2,835,480.00	1,130,011.04

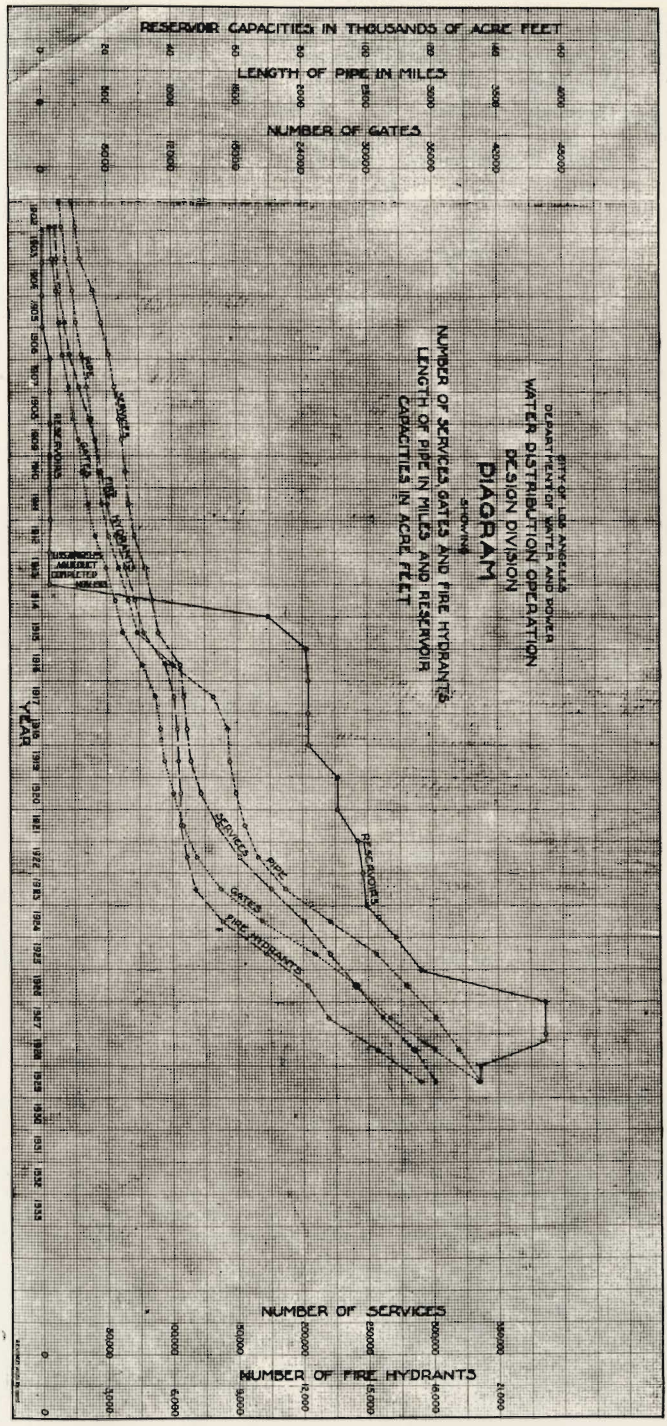
STATEMENT SHOWING VOLUME OF BUSINESS OF WAREHOUSES
FISCAL YEAR 1928–1929

Warehouse	Receipts Fiscal Year 1928–1929	Issues Fiscal Year 1928–1929	Volume of Business
General Warehouse	1,684,634.61	1,815,493.31	3,500,127.92
Independence Warehouse	240,522.60	299,884.95	540,407.55
Van Nuys Warehouse	424,036.18	464,299.74	888,335.92
Mojave Warehouse	15,884.51	22,642.73	38,527.24
San Pedro Warehouse	223,516.85	233,159.27	456,676.12
TOTAL	2,588,594.75	2,835,480.00	5,424,074.75

STATEMENT SHOWING PERCENTAGE TURNOVER OF STOCK
FISCAL YEAR 1928–1929

Warehouse	Percent Turnover	Warehouse	Percent Turnover
General Warehouse	220	Independence Warehouse	104
Van Nuys Warehouse	237	Mojave Warehouse	133
San Pedro Warehouse	448	Average Percent Turnover—All Warehouses	206


SAN FERNANDO VALLEY IRRIGATION WATER CONSUMPTION - ACRE FEET
1928
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1929
JAN FEB MAR APR MAY JUNE
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
500
0
CALENDAR YEAR:
CONSUMPTION - 77827 ACRE FEET
ROTATED ACREAGE - 60358
FISCAL YEAR:
CONSUMPTION - 75095 ACRE FEET


CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
WATER DISTRIBUTION OPERATION
DESIGN DIVISION
DIAGRAM
SHOWING
NUMBER OF SERVICES, GATES AND FIRE HYDRANTS
LENGTH OF PIPE IN MILES AND RESERVOIR
CAPACITIES IN ACRE FEET
RESERVOIR CAPACITIES IN THOUSANDS OF ACRE FEET
LENGTH OF PIPE IN MILES
NUMBER OF GATES
NUMBER OF SERVICES
NUMBER OF FIRE HYDRANTS
YEAR
SERVICES
PIPE
GATES
FIRE HYDRANTS
RESERVOIRS
AQUEDUCT
COMPLETED

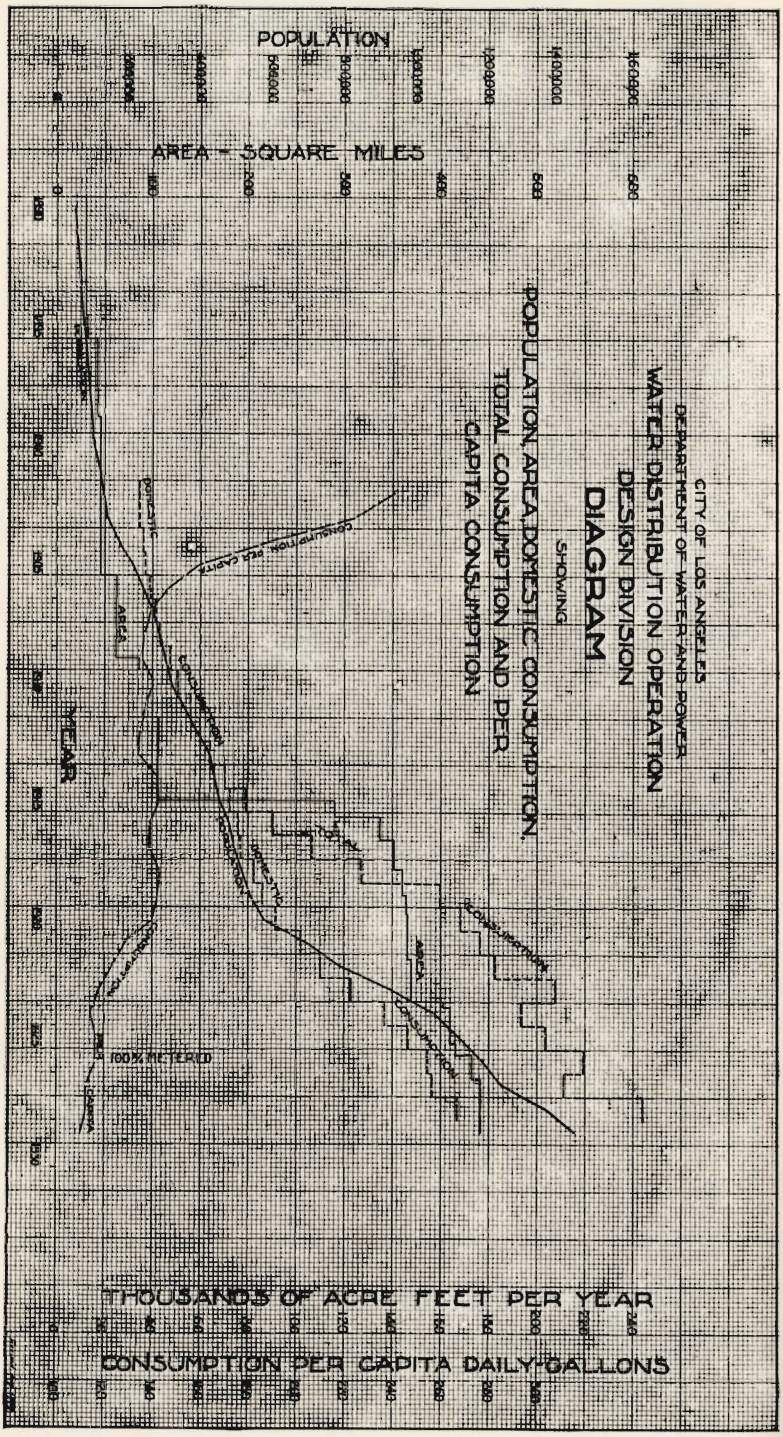

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
WATER DISTRIBUTION OPERATION
DESIGN DIVISION
DIAGRAM
SHOWING
POPULATION, AREA, DOMESTIC CONSUMPTION,
TOTAL CONSUMPTION AND PER
CAPITA CONSUMPTION
POPULATION
AREA - SQUARE MILES
YEAR
CONSUMPTION PER CAPITA DAILY-GALLONS
THOUSANDS OF ACRE FEET PER YEAR
100% METERED

TABLE SHOWING TOTAL WATER CONSUMPTION YEAR 1928-29

	Domestic			
	Second Feet	Million Gals. Per Day	Irrigation Second Feet	Total Second Feet
July	280.8	181	272.9	553.7
August	280.5	181	219.7	500.2
September	271.4	175	136.1	407.5
October	233.3	151	76.6	309.9
November	207.6	134	31.4	239.0
December	183.3	118	10.0	193.3
January	189.7	122	18.1	207.8
February	190.1	123	3.0	193.1
March	216.0	139	27.2	243.2
April	229.8	147	53.3	283.1
May	287.3	185	174.7	462.0
June	301.4	195	190.5	491.9
Mean	239.2	154	101.1	340.4
Mean—Summer	274.7	177	175.0	449.7
Mean—Winter	203.3	131	27.7	231.1
Peak—July 16th-23rd	287.	185	304.	591.

Total Rainfall for Season: 12.66 inches—83% of Normal.

METERS AND SERVICES

DOMESTIC METERS IN SERVICE

⅝ Inch	81,864
⅝ x ¾ "	106,764
¾ "	2,326
¾ x 1 "	20,298
1 "	12,472
1½ "	5,660
2 "	3,227
3 "	567
4 "	368
6 "	80
8 "	4

Number of domestic meters in service, June 30, 1929	233,630
Number of domestic meters in service, June 30, 1928	227,210
Number of meters set during the year	6,420
Meters in service, Domestic and Combination	233,630
Meters in service, Intermittent Irrigation	3,383
Meters in service, Jet meters for sewer flushing	8,732
Grand total	245,745

NOTE:—There are 482 of above meters in service on Detector Check Valves for Fire Services under the METERED SERVICES account, also the above 8,732 Jet meters do not appear in the METER REPAIR REPORT.

METER REPAIR OPERATIONS

Meters removed for not operating:			
On account of damage by hot water	5,323		
From other causes	7,672		
Total removed for not operating		12,995	
Meters removed for minor repairs, or on account of discontinuance or enlargement of service		8,066	
Total meters brought to Shop			21,061
Percent of non-operation due to damage by hot water			40.96%
Cost of changing and repairing such damaged meters			$13,486.45
Amount collected for damage to meters			9,134.47
Number of meters changed from straight reading to round dial type of register			208
Number of meters changed from open type gear train to oil enclosed			6,123

METER REGISTRATION

Results of tests of ⅝x¾", ¾x1" and 1" water meters, selected at random after one to ten years' continuous service, for accuracy on both fast and slow flows:

Fast Flow:

For ⅝x ¾"	meters	1½ cu. ft. per min.
For ¾x1"	meters	2 cu. ft. per min.
For 1"	meters	3 cu. ft. per min.

Slow Flow:

10 cubic feet per hour for all sizes of meters.

Length of Time in Service	Number and Sizes of Meters Tested	Average Percent of Registration			
		When Installed		When Removed	
		Fast Flow	Slow Flow	Fast Flow	Slow Flow
7 Years	50—1"	99.74	100.42	101.04	97.16
7 Years	50—¾x1"	99.20	100.66	100.46	100.14
1 Year	100—⅝x¾"	99.55	100.37	100.52	101.36
2 Years	100— "	98.90	100.82	100.19	100.74
3 Years	100— "	99.38	100.38	100.81	101.49
4 Years	100— "	99.17	101.91	100.75	97.10
5 Years	100— "	99.32	100.56	101.04	99.90
6 Years	100— "	99.51	101.36	101.59	101.24
7 Years	50— "	99.36	101.14	101.66	95.46
8 Years	50— "	99.62	101.64	102.22	102.02
9 Years	50— "	99.98	100.03	100.56	97.94
10 Years	50— "	99.34	100.64	97.94	97.76
General Average		99.38	100.87	100.76	99.67

NOTE:—In making this test, 900 meters were temporarily removed from service.

It is apparent from the foregoing table that it would not be good practice from the standpoint of economy to make periodical tests of all meters in service, especially when it is considered that all our meters are read monthly the registration carefully scrutinized and compared with former registrations, and an inspection ordered of all meters whose readings indicate a sudden or gradual falling-off in registration.

PUMPING PLANT OPERATING DATA

PLANT	Pumped to	Period Operated	Running time in per cent of year's Time	Gallons Pumped for Fiscal Year 1928-29	Gallons Pumped for Fiscal Year 1927-28	Per cent of Increase or Decrease 1928-29 over 1927-28	Max'm Demand per day in per cent of Capacity	Quantity Energy Consumed		
								Electricity K. W. Hours	Gas Cu. Ft.	Diesel Oil Gallons
Ascot	704 or Bairdstown Tank	Entire Year	20.2	308,495,000	315,977,000	2.2 Decrease	79.8	247,850		
Buena Vista	613 or Salano Reservoir	Entire Year	46.	1,716,759,500	1,952,043,000	12.2 Decrease	81.	1,772,620	91,233,872	
	613 or Ascot & Highland Reservoirs	Entire Year	46.	3,259,739,100	2,360,450,087	38. Increase				
Franklin	1418 or Laurel Tank	Entire Year	31.8	472,051,000	460,801,000	2.5 Increase	79.2	1,549,301		
Garvanza	922 or Eagle Rock Tank	Entire Year	48.8	835,680,000	736,000,000	13.5 Increase	77.5	2,101,800		
	930 or High Garvanza Reservoir	Entire Year	34.4	614,572,000	786,000,000	22. Decrease	65.9			
Mead	938 or Mead Tank	Entire Year	11.2	238,458,000	208,982,000	14. Increase	61.3	282,300		
Mount Washington	927 or Mt. Washington Tank	Entire Year	19.4	121,170,966	131,990,464	8.1 Decrease	34.	250,200		
Riverside	765 or Edendale Tank	Entire Year	33.8	1,036,728,000	400,110,000	15.9 Increase	100.	3,725,880		
	613 or Highland Reservoir	Entire Year	27.1	1,658,690,000	1,730,970,000	4.1 Decrease	66.4			
Rowena	448 or High Gravity System	Entire Year	35.2	1,126,920,000	1,608,000,000	30. Decrease	100.	179,640		
Seventh St.	448 or Boyle Hts.	Entire Year	22.	243,269,325	538,875,000	54.8 Decrease	44.6	133,100		
San Pedro	382 or High Tank	Entire Year	46.7	397,845,566	342,454,000	16. Increase	100.	618,900		
	599 or Hill Service	Entire Year	4.5	51,015,364	32,472,366	57.4 Increase	11.2			
Alta Vista "A"	1720 or Alta Vista Tank	June (1 mo.)	"C"	326,000				525		
Granada No. 1 "A"	1371 or Granada No. 1 Tank	June (1 mo.)	"C"	835,000				1,700		
Granada No. 2 "A"	1612 or Granada No. 2 Tank	June (1 mo.)	"C"	54,000				225		
Harbor City "A"	266 or Harbor City Tank	June (1 mo.)	"C"	466,850				345		
Wonderland Ave. "A"	1465 or Wonderland Tank	June (1 mo.)	"C"	"D"				90		
Tujunga & Orias "A"	1160 or Low Gravity System	June (1 mo.)	"C"	"D"				12,430		
Kelvin Ave. "A"	1038 or Low Gravity System	Entire Year	20.8	54,500,000				31,400		
Barnes City "A"	200 or Low Gravity System	June (1 mo.)	"C"	275,000				255		
Crystal Springs P. P.	374 or Low Gravity System	July to Dec. Mar. to June (10 mos.)	60.	1,541,266,000	1,076,934,000	43. Increase	100.	847,700		
Crystal Springs Wells	374 or Low Gravity System	July to Dec. Mar. to June (10 mos.)	24.2	3,906,356,000	1,296,377,500	202. Increase	100.	977,369		
Figueroa	344 or Low Gravity System	July to Nov. Mar. to June (9 mos.)	56.	877,293,000	843,937,000	1.8 Decrease	100.		52,905,700	
Headworks	477 or Silver Lake Reservoir	Entire Year	80.	3,305,802,319	2,307,012,000	43.2 Increase	100.		36,601,500	
Lankershim Wells	746 or Hollywood Reservoir	July, Aug., June (3 mos.)	13.4	889,000,000	479,000,000	85.5 Increase	100.	"B" 1,370,300		1,595,800
Lomita	177 or San Pedro Reservoir	Entire Year	48.6	2,200,970,000	2,059,960,000	7. Increase	49.1	"B" 3,196,880		320,085
Manhattan	510 or Low Gravity System	July to Nov. Apr. to June (8 mos.)	15.3	752,320,000	934,609,000	19.5 Decrease	78.1	"B" 1,074,990		94,050
Mission Wells	1131 or Low Gravity System	July to Nov. May to June (7 mos.)	34.8	694,079,400	609,297,000	14. Increase	80.	438,920		
Ninety-Ninth Street "A"	312 or Low Gravity System	July to Nov. Mar. to June (9 mos.)	7.2	195,725,485			100.	262,400		
Pollock	374 or Low Gravity System	July to Dec. Apr. to June (9 mos.)	24.	1,369,320,000	1,301,031,000	5. Increase	100.	733,800		
Wilmington	177 or Low Gravity System	Entire Year	26.3	638,856,000	397,010,000	60.8 Increase	100.	1,157,530		
Slauson	374 or Low Gravity System	July to Nov. Mar. to June (9 mos.)	41.	525,035,000	469,238,640	12. Increase	68.6		33,546,700	
	TOTALS			28,633,833,875	23,429,531,140			20,968,450	214,287,772	2,009,935

	1928 and 1929	1927 and 1928	Per Cent of Increase over 1927 and 1928
Total Water handled in Ground Water Pumping Plants	16,496,278,204 Gals.	11,824,406,140 Gals.	39.5 Increase
Total Water handled in step up Water Pumping Plants	12,137,555,671	11,605,125,003	4.5 Increase
Total Water handled in all Water Pumping Plants	28,633,833,875	23,429,531,143	22.2 Increase
Total Water handled by Steam Driven Plants	7,967,869,419		
Total Water handled by Diesel Driven Plants	3,442,270,000		
Total Water handled by Electrically Driven Plants	17,223,694,456		
Total Water handled by all Plants	28,633,833,875		

ELECTRICAL ENERGY GENERATED IN DIESEL PLANTS

Lankershim	16,279,549	K. W. Hours	
Lomita	3,196,880	"	"
Manhattan	1,074,990	"	"
	20,551,419	"	"

Total Electrical Energy Used	20,968,450	K. W. Hours	
Total Electrical Energy Credited as generated	20,551,419	"	"
Electrical Energy Purchased from Power Department	417,031	"	"

KEY: "A"—This Plant not listed in 1927 and 1928 Report.
"B"—This Energy Generated at Plant in question.
"C"—Running Time less than one per cent.
"D"—No records available.

WATER SERVICES—ALL DISTRICTS

Metered Services, Meters in	233,182
Metered Services, Meters out	32,137
Flat rate fire services, with Detector Check Valves and Meter	482
Flat rate fire services, without Detector Check Valves and Meter	1,182
Flush Tank Services, Jet Metered	8,732
Flush Tank Services, not metered	763
Disconnected Services	1,280
Services sold not yet installed	1,630
Services installed in advance of paving—Dept.'s Expense	18,051
	297,439
San Fernando Valley Irrigation Services, Meters in	3,383
San Fernando Valley Irrigation Services, Meters out	241
TOTAL number of services in the system, June 30, 1929	301,063
TOTAL number of services in the system, June 30, 1928	285,236
INCREASE of services for the fiscal year	15,827

SERVICES FOR ALL USES

Los Angeles	San Pedro	San Fernando Valley	Sawtelle	Total
245,424	17,092	22,236	16,311	301,063

SERVICE INCREASE

9,020	2,361	1,472	2,974	15,827

SERVICE WORK—ALL DISTRICTS

Month	Domestic	Fire	Flush Tanks	Vacant Lots 1911 Act	Vacant Lots Collect	Temp.	Enlargements	Renewals
July, 1928	600	5	97	799	258	9	14	326
August	515	9	34	590	261	13	17	100
September	405	11	63	751	141	13	19	600
October	763	13	32	607	304	11	23	399
November	474	2	57	813	204	19	8	187
December	491	7	59	339	270	25	20	275
January, 1929	423	7	41	787	181	21	15	564
February	377	11	19	341	157	10	9	324
March	476	15	76	315	205	16	18	336
April	403	12	30	274	152	13	21	315
May	603	10	76	524	155	26	26	577
June	503	9	57	464	151	25	23	291
TOTAL	6033	111	641	6604	2439	201	213	4294

NOTE:—Irrigation Services and Combined Domestic and Irrigation Services are included with "Domestic." The total service work for the fiscal year for all purposes amounts to 20,536 installations.

REPAIRS TO WATER MAINS, SERVICES AND HYDRANTS LOS ANGELES, SAWTELLE AND SAN PEDRO

Main Leaks	4,465
Service Leaks	9,712
Hydrant Leaks	1,792
Miscellaneous Jobs	1,827
Total	17,796

OPERATION OF SERVICES AND METERS—ALL DISTRICTS

Field Meter Inspectors and Repairmen

Meter Changes and take outs	14,730
Water turned on	28,336
Water turned off	23,009
Meters read-to-date	14,082
Regular readings	9,296
Meter Leaks	5,831
Inspections	35,515
Meter Glasses renewed	12,853
Boxes renewed	3,274
Dials cleaned	2,608
Boxes lowered and cleaned	6,435
Center pieces replaced	465
Miscellaneous Jobs	30,528
TOTAL number of jobs	186,962
TOTAL cost of above jobs	$96,156.30
Average cost per job	$0.514
Average number of jobs per work day	612

MEMORANDUM BILLING—ALL DISTRICTS

Fiscal Year

District	Service Installations, Meters Burned and Damaged Location Changes, Etc. No. Bills	Amount	Construction Water No. Bills	Amount
Los Angeles	423	$49,479.29	3410	$65,413.98
San Pedro	71	6,798.41	671	6,451.58
San Fernando Valley	123	30,665.91	194	8,667.22
Sawtelle	93	11,623.24	85	6,034.48
TOTAL	710	$98,566.85	4360	$86,567.26
TOTAL number of bills made				5,070
TOTAL amount of bills				$185,134.11

IRRIGATION—SAN FERNANDO VALLEY

Fiscal Year

Month	Irrigations Checked	Meter Sets and Take Outs	Turn Offs and Turn Ons	No. of Irrigations	MINERS' INCHES Average Per Mo.	Average 24 Hr. Max.	Auto Mileage
July, 1928	16,286	1,095	11,970	5,985	13,708	16,711	19,244
August	14,859	704	7,132	3,566	10,901	15,629	18,082
September	11,941	377	5,298	2,649	6,973	8,490	15,989
October	6,964	173	3,542	1,771	3,860	6,348	14,240
November	3,235	75	1,658	829	1,570	4,506	9,771
December	1,191	118	646	323	501	1,258	6,844
January, 1929	1,910	45	978	489	783	2,390	6,955
February	580	26	286	143	203	691	5,637
March	2,826	125	1,650	825	1,409	4,118	7,513
April	4,262	238	2,166	1,083	2,947	8,239	12,580
May	13,415	1,068	6,436	3,218	8,640	10,929	19,900
June	14,776	1,159	7,302	3,651	10,166	15,593	20,350
TOTAL	92,245	5,163	49,064	24,532	.....	.....	157,105

PIPE REPORT FISCAL YEAR 1928-1929, ENDING JUNE 30, 1929
Summary of 4" in Diameter and Larger

DISTRICT	Total in System June 30, 1928	Laid 1928-1929	Acquired	Total in System June 30, 1929
Los Angeles City	2,250.048 Miles	128.088 Miles	3.653 Miles	2,337.666 Miles
Harbor	163.675 "	24.856 "	2.393 "	188.703 "
San Fernando Valley	782.254 "	55.485 "	.....	832.241 "
GRAND TOTAL	3,195.977 "	208.429 "	6.046 "	3,358.610 "
				3,195.977 "
			NET GAIN	162.633 Miles

Pipe Classification—Entire Distribution System

	STEEL										CAST IRON											
							Bell and Spigot Steel				American Water Works Standard				Centrifugal				McWane			Metro-politan Joint
	Con-crete	Riv'td Con-crete Cover-ed	Lap Weld-ed	Rivet-ed Steel	O.D. Cas-ing	Stand-ard Screw	Math.	Mann.	Mann. Wrp'd	Mann. Wld'd	B	B–C	C	D	DeLavaud #250	DeLavaud #350	Mono Cast #250	Mono Cast #350	#150	#250	#350	
Los Angeles City Miles	.....	.926	.706	86.017	54.180	119.825	52.342	10.201	.....	3.119	1,621.998	8.868	130.102	1.066	120.260	.....	15.962	41.589	.395	38.347	31.763	.....
% of Total	.....	.039	.030	3.680	2.318	5.126	2.239	.436	.....	.133	69.385	.379	5.565	.046	5.145	.....	.683	1.779	.017	1.640	1.359	.....
Group %				11.193%				2.809%									85.998%					
Harbor Miles	.....	.....	.....	.269	.825	.919	.....	.469	.....	.....	151.378	.....	2.301	.053	5.193	.654	20.323	1.491	.....	2.635	1.876	.317
% of Total	.....	.....	.....	.143	.437	.487	.....	.248	.....	.....	80.220	.....	1.220	.028	2.753	.346	10.770	.791	.....	1.396	.994	.168
Group %				1.066%				.248%									98.686%					
San Fernando Miles	2.190	1.657	.....	289.160	8.590	15.925	277.905	88.779	.070	.....	71.495	.....	27.763	.....	34.952	.....	.....	3.037	.....	3.739	6.980	.....
% of Total	.263	.199	.....	34.745	1.032	1.914	33.392	10.668	.008	.....	8.590	.....	3.336	.....	4.200	.....	.....	.365	.....	.449	.839	.....
Group %	.263%			37.890%				44.068%									17.779%					
Grand Total Miles	2.190	2.583	.706	375.446	63.595	136.669	330.247	99.449	.070	3.119	1,844.871	8.868	160.166	1.119	160.405	.654	36.285	46.117	.395	44.721	40.619	.317
% of Total	.065	.077	.021	11.179	1.893	4.069	9.833	2.961	.002	.093	54.930	.264	4.769	.033	4.776	.020	1.080	1.373	.012	1.332	1.209	.009
Group %	.065%			17.239%				12.889%									69.807%					

Los Angeles City District	116.217 Miles	or 10,677.81	tons of cast iron pipe were laid
Harbor District	24.848 "	" 3,020.18	" " " " " " " "
San Fernando Valley District	15.662 "	" 1,303.74	" " " " " " " "
ENTIRE SYSTEM	156.727 "	" 15,001.73	" " " " " " " "

PIPE REPORT FISCAL YEAR 1928–1929, ENDING JUNE 30, 1929
LOS ANGELES CITY DISTRICT

Size	Total 6-30-28	Size Groups	% of Total	Extensions	Betterments	Enlargements	Acquired	Removals	Aband.	Total 6-30-29	Size Groups	% of Total
4″	5187471	.....	.....	29557	43561	.....	8037	103175	57666	5107785	.....	.....
5″	7054	5194525	43.724	.....	410	.....	.....	.....	29	7435	5115220	41.443
6″	4008768	.....	.....	161333	169993	.....	8509	46474	8540	4293589	.....	.....
7″	4564	4013332	33.782	.....	.....	.....	.....	.....	.....	4564	4298153	34.823
8″	963010	963010	8.106	80023	1155	109582	2742	5632	3482	1147398	1147398	9.296
4″–8″	.....	10170867	85.612	270913	215119	109582	19288	155281	69717	.....	10560771	85.562
10″	218621	.....	1.840	25	.....	.....	.....	22	.....	218624	.....	1.772
12″	639531	.....	5.383	22641	1552	34666	.....	1947	.....	696443	.....	5.642
14″	12893	.....	.108	.....	.....	.....	.....	.....	.....	12893	.....	.104
10″–14″	.....	871045	7.332	22666	1552	34666	.....	1969	.....	.....	927960	7.518
4″–14″	.....	11041912	92.944	293579	216671	144248	19288	157250	69717	.....	11488731	93.080
16″	127769	.....	1.075	2109	384	1592	.....	2250	190	129414	.....	1.048
18″	57681	.....	.485	.....	4329	.....	.....	1610	185	60215	.....	.488
20″	76485	.....	.644	.....	.....	.....	.....	.....	.....	76485	.....	.620
16″–20″	.....	261935	2.204	2109	4713	1592	.....	3860	375	.....	266114	2.156
4″–20″	.....	11303847	95.148	295688	221384	145840	19288	161110	70092	.....	11754845	95.236
22″	6573	.....	.055	.....	.....	.....	.....	.....	.....	6573	.....	.053
24″	243633	.....	2.051	13	152	.....	.....	67	320	243411	.....	1.972
27″	8163	.....	.069	.....	465	.....	.....	.....	465	8163	.....	.066
30″	127969	.....	1.077	.....	398	.....	.....	311	570	127486	.....	1.033
36″	116813	.....	.983	.....	.....	.....	.....	.....	.....	116813	.....	.947
40″	38676	.....	.326	.....	643	11687	.....	.....	.....	51006	.....	.413
42″	10332	.....	.087	.....	35	.....	.....	35	.....	10332	.....	.084
44″	905	.....	.008	.....	.....	.....	.....	.....	.....	905	.....	.007
48″	2119	.....	.018	.....	.....	.....	.....	.....	.....	2119	.....	.017
52″	16896	.....	.142	.....	.....	.....	.....	.....	.....	16896	.....	.137
68″	4326	.....	.036	.....	.....	.....	.....	.....	.....	4326	.....	.035
22″–68″	.....	576405	4.852	13	1693	11687	.....	413	1355	.....	588030	4.764
4″–68″	.....	11880252	100.%	295701	223077	157527	19288	161523	71447	.....	12342875	100.%
Miles in System		2250.047		56.004	42.249	29.835	3.653	30.591	13.532	.....	2337.665	.....
Laid					128.088							
										Net Gain:	87.618 Miles	

56.004 Miles of mains were laid for extensions.
49.135 Miles of which are cast iron pipe.
42.249 Miles of mains were laid for betterments.
29.835 Miles of mains were laid for enlargements.
67.082 Miles of which are cast iron pipe.
37.840 Miles of mains were laid by Street Improvement Acts.
10.748 Miles of mains were laid in M.I.D. No. 36 which is 89.32% complete.
3.624 Miles of mains were laid in M.I.D. No. 58 which is 18.59% complete.

PIPE REPORT FISCAL YEAR 1928-29, ENDING JUNE 30, 1929

SAN FERNANDO VALLEY DISTRICT

Size	Total 6-30-28	Size Groups	% of Total	Extensions	Betterments	Enlargements	Acquired	Removals	Aband.	Total 6-30-29	Size Groups	% of Total
4″	489700	.....	11.856	18070	26	.....	.....	388	3169	504239	.....	11.476
6″	1637019	.....	39.635	209394	11449	.....	.....	11604	1909	1844349	.....	41.972
8″	805136	.....	19.494	25016	202	3695	.....	7016	1494	825539	.....	18.786
4″–8″	.....	2931855	70.985	252480	11677	3695	.....	19008	6572	.....	3174127	72.234
10″	687	.....	.016	7	.....	.....	.....	.....	.....	694	.....	.016
12″	455151	.....	11.019	15761	59	5088	.....	2366	20	473673	.....	10.779
14″	231856	.....	5.614	.....	.....	.....	.....	8	.....	231848	.....	5.277
10″–14″	.....	687694	16.649	15768	59	5088	.....	2374	20	.....	706215	16.072
4″–14″	.....	3619549	87.634	268248	11736	8783	.....	21382	6592	.....	3880342	88.306
16″	101684	.....	2.462	3151	1042	.....	.....	10	.....	105867	.....	2.409
18″	31645	.....	.766	.....	.....	.....	.....	.....	1042	30603	.....	.696
16″–18″	.....	133329	3.228	3151	1042	.....	.....	10	1042	.....	136470	3.105
4″–18″	.....	3752878	90.862	271399	12778	8783	.....	21392	7634	.....	4016812	91.411
20″	43650	.....	1.056	.....	.....	.....	.....	.....	.....	43650	.....	.993
22″	12313	.....	.298	.....	.....	.....	.....	.....	.....	12313	.....	.280
24″	40042	.....	.969	.....	.....	.....	.....	.....	.....	40042	.....	.911
27″	5854	.....	.141	.....	.....	.....	.....	.....	.....	5854	.....	.133
30″	60215	.....	1.457	.....	.....	.....	.....	.....	.....	60215	.....	1.370
32″	5397	.....	.130	.....	.....	.....	.....	.....	.....	5397	.....	.123
33″	12022	.....	.291	.....	.....	.....	.....	.....	.....	12022	.....	.274
36″	53020	.....	1.283	.....	.....	.....	.....	.....	.....	53020	.....	1.207
39″	18570	.....	.449	.....	.....	.....	.....	.....	.....	18570	.....	.423
42″	8742	.....	.211	.....	.....	.....	.....	.....	.....	8742	.....	.199
45″	7911	.....	.191	.....	.....	.....	.....	.....	.....	7911	.....	.180
48″	5265	.....	.127	.....	.....	.....	.....	.....	.....	5265	.....	.120
50″	7888	.....	.190	.....	.....	.....	.....	.....	.....	7888	.....	.180
52″	20095	.....	.486	.....	.....	.....	.....	.....	.....	20095	.....	.457
54″	8237	.....	.199	.....	.....	.....	.....	.....	.....	8237	.....	.187
60″	4845	.....	.117	.....	.....	.....	.....	.....	.....	4845	.....	.110
62″	4501	.....	.108	.....	.....	.....	.....	.....	.....	4501	.....	.102
64″	9828	.....	.237	.....	.....	.....	.....	.....	.....	9828	.....	.224
66″	15877	.....	.384	.....	.....	.....	.....	.....	.....	15877	.....	.361
68″	1488	.....	.036	.....	.....	.....	.....	.....	.....	1488	.....	.034
72″	31530	.....	.763	.....	.....	.....	.....	.....	.....	31530	.....	.718
Transitions	131	.....	.003	.....	.....	.....	.....	.....	.....	131	.....	.003
20″–72″	.....	377421	9.138	271399	12778	8783	.....	21392	7634	.....	377421	8.589
4″–72″	.....	4130299	100.%	.....	.....	.....	.....	.....	.....	.....	4394233	.....
Miles in	System	782.254	.....	51.401	2.420	1.664	.....	4.052	1.446	.....	832.241	100.%
Laid					55.485							

Net Gain 49.987 Miles

51.401 Miles of mains were laid for extensions.
15.485 Miles of which are cast iron.
2.420 Miles of mains were laid for betterments.
1.633 Miles of mains were laid for enlargements.
.177 Miles of which are cast iron.
38.327 Miles of Bell and Spigot steel were laid.
14.962 Miles of mains were laid by Street Improvement Acts.
7.045 Miles of mains were laid in M.I.D. No. 53, which is 45.015% complete.
4.648 Miles of mains were laid in M.I.D. No. 54, which is 45.75% complete.
1.171 Miles of mains were laid in M.I.D. No. 27, which is 100% complete.

PIPE REPORT FISCAL YEAR 1928-1929, ENDING JUNE 30, 1929
HARBOR DISTRICT

Size	Total 6-30-28	Size Groups	% of Total	Extensions	Betterments	Enlargements	Acquired	Removals	Aband.	Total 6-30-29	Size Groups	% of Total
4″	200294	.....	23.176	15821	225	.....	2823	4777	303	214083	.....	21.487
5″	4567	.....	.528	.....	.....	.....	.....	.....	34	4533	.....	.455
6″	439606	.....	50.868	58903	9874	.....	9517	6509	17	511374	.....	51.324
8″	63782	.....	7.380	18934	.....	7723	297	.....	.....	90736	.....	9.107
4″–8″	.....	708249	81.953	93658	10099	7723	12637	11286	354	.....	820726	82.373
10″	42685	.....	4.939	.....	.....	.....	.....	.....	.....	42685	.....	4.284
12″	40436	.....	4.679	6021	.....	.....	.....	19	.....	46438	.....	4.661
14″	1440	.....	.166	.....	.....	.....	.....	.....	69	1371	.....	.138
10″–14″	.....	84561	9.784	6021	.....	.....	.....	19	69	.....	90494	9.083
4″–14″	.....	792810	91.738	99679	10099	7723	12637	11305	423	.....	911220	91.456
16″	21172	.....	2.449	.....	.....	.....	.....	.....	.....	21172	.....	2.125
20″	50225	.....	5.811	2997	.....	10741	.....	.....	.....	63963	.....	6.419
16″–20″	.....	71397	8.261	2997	.....	10741	.....	.....	.....	.....	85135	8.544
4″–20″	.....	864207	100.%	102676	10099	18464	12637	11305	423	.....	996355	100.%
Miles in System		163.675	.....	19.446	1.913	3.497	2.393	2.141	.080	.....	188.703	.....
Laid					24.856							

Net Gain..... 25.028 Miles

19.446 Miles of mains were laid for extensions.
19.439 Miles of which are cast iron pipe.
1.913 Miles of mains were laid for betterments.
3.497 Miles of mains were laid for enlargements.
5.409 Miles of which are cast iron pipe.
.611 Miles of mains were laid by Street Improvement Acts.
14.091 Miles of mains were laid in M.I.D. No. 52 which is 64% complete.

ROTATED CROP ACREAGE—SAN FERNANDO VALLEY

Calendar Year—1928

Crop	Acres	Acre Feet	Duty	Per cent of Total
Alfalfa	5,979	14,053	2.35	18.1
Citrus	9,362	17,130	1.83	22.0
Deciduous	4,554	2,823	0.63	3.6
Beans	13,939	16,900	1.21	21.7
Walnuts	8,314	5,094	0.61	6.5
Lettuce				
Spring	1,087	1,003	0.92	1.3
Fall	1,640	2,460	1.50	3.2
Potatoes				
Spring	2,551	2,084	0.81	2.7
Fall	597	652	1.09	.8
Sweet	515	748	1.45	1.0
Miscellaneous	11,820	14,880	1.26	19.1
TOTAL	60,358	77,827	1.29	100

Miscellaneous includes truck crops, berries, roses, etc.
The net irrigated area is 51,358 acres.

GATES

LOS ANGELES CITY

Size	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
4"	11,041	67	11,108
5"	44	.....	44
6"	11,908	1,807	13,715
7"	11	.....	11
8"	1,437	409	1,846
10"	262	12	274
12"	720	54	774
14"	10	.....	10
16"	62	1	63
18"	24	.....	24
20"	139	1	140
22"	2	.....	2
24"	93	.....	93
26"	4	.....	4
30"	15	3	18
36"	10	.....	10
	25,782	2,354	28,136

HARBOR DISTRICT

4"	409	41	450
5"	2	.....	2
6"	1,289	411	1,700
8"	118	38	156
10"	45	1	46
12"	44	4	48
16"	20	3	23
18"	.....	7	7
20"	.....	2	2
22"	1	.....	1
	1,928	507	2,435

SAN FERNANDO DISTRICT

4"	5,759	445	6,204
6"	2,154	747	2,901
8"	235	26	261
10"	4	.....	4
12"	129	19	148
14"	9	.....	9
16"	11	.....	11
18"	13	.....	13
20"	3	.....	3
22"	4	.....	4
24"	11	.....	11
26"	1	.....	1
30"	4	.....	4
36"	6	.....	6
48"	3	.....	3
54"	1	.....	1
	8,347	1,237	9,584

GATE SUMMARY

District	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
Los Angeles City	25,782	2,354	28,136
Harbor District	1,928	507	2,435
San Fernando District	8,347	1,237	9,584
TOTAL	36,057	4,098	40,155

VENTURI METERS

SUMMARY

District	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
Los Angeles City	22	1	23
Harbor District	4	0	4
San Fernando District	1	3	4
TOTAL	27	4	31

CONTENTS OF LOS ANGELES

DOMESTIC WATER DISTRIBUTING SYSTEM

Year (June 30)	Contents of Entire System (Gallons)	Miles of Pipe in System	Gallons Per Mile of Pipe	Equivalent Diam. Pipe
1920	59,153,862	1,489.562	39,710.88	13½"
1925	77,403,896	2,569.453	30,122.40	11¾"
1926	79,639,641	2,792.613	28,517.28	11½"
1927	79,302,570	3,020.212	26,252.16	11 "
1928	83,983,150	3,195.977	26,273.48	11 "
1929	86,877,185	3,358.610	25,867.00	11 "

FIRE HYDRANTS

LOS ANGELES CITY

Size	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
2½" Single	10,911	812	11,723
2½" Double	78	6 Decrease	72
2½"x4"	96	411	507
4" Double	1,414	37	1,451
	12,499	1,254	13,753

HARBOR DISTRICT

Size	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
2½" Single	751	208	959
2½" Double	20	1	21
4" Double	116	5	121
	887	214	1,101

SAN FERNANDO DISTRICT

Size	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
2½" Single	2,034	517	2,551
2½" Double	1	.....	1
4" Double	.....	.....	.....
	2,035	517	2,552

FIRE HYDRANT SUMMARY

Size	In System June 30, 1928	Net Increase During Year	In System June 30, 1929
Los Angeles City	12,499	1,254	13,753
Harbor District	887	214	1,101
San Fernando District	2,035	517	2,552
TOTAL	15,421	1,985	17,406

Report of the Controller

August 1, 1929.

To the Honorable Board of Water and Power Commissioners,
City of Los Angeles.

Gentlemen:

I beg to submit herewith statements of the financial operations of the Department of Water and Power for the annual report for the fiscal year ending June 30, 1929.

The net income, after providing for operation, depreciation and bond interest of the Water Works and Supply Division, was $1,061,118.74, after deducting $786,179.78 for water furnished the municipality, that was not paid for in cash but for which credit is allowed on bond requirement charges paid by this Department.

The net income of the Power and Light Division was $3,626,972.23.

Respectfully submitted,

L. M. ANDERSON,
Controller.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER

INDEX OF EXHIBITS
JUNE 30, 1929

Exhibit I

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
WATER REVENUE FUND

CASH TRANSACTIONS
YEAR ENDING JUNE 30, 1929

Balance in Fund July 1, 1928		$ 1,040,288.10
RECEIPTS		
Returned to Fund account of cancellation of Demand Checks covering payroll deductions	$ 29,917.40	
Consumers' Accounts	8,179,391.50	
Meter and Service Installations and Changes	149,473.40	
Fire Hydrant Installations	18,500.00	
Street Main Assessments	214,190.59	
Acreage Assessments	10,729.66	
Miscellaneous Collections	43,104.04	
Deposits Returnable	139,074.07	
Bills Collectible	4,213,004.74	
Owens Valley Light and Power Collections	294,776.30	
*Total Receipts		13,292,161.70
Total Receipts and Cash on Hand		$14,332,449.80
DISBURSEMENTS		
Demands Drawn on City Treasurer:		
Salaries and Wages	$ 4,548,595.11	
Materials, Supplies and Equipment	2,922,105.81	
Outside Services and Personal Expenses	1,103,130.28	
Land and Building Purchases	43,720.95	
Bond Interest and Redemption Requirements	2,687,727.35	
Taxes	173,914.65	
Municipal Improvement District Funds	750,504.45	
City of Los Angeles General Fund	155,000.00	
Refunds and Miscellaneous Items	732,212.85	
Total Disbursements		13,116,911.45
Cash on Hand June 30, 1929:		
Cashier	$ 168,680.44	
City Treasurer	1,046,857.91	$ 1,215,538.35

*—Included in Total Receipts is an amount of $3,479,945.41 received on Internal Demands.

Exhibit II

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

DIVISION OF WATER WORKS AND SUPPLY

BALANCE SHEET

JUNE 30, 1929

ASSETS

PLANT AND SYSTEM:			
Lands and Water Rights		$20,627,443.55	
Source of Water Supply System		26,597,833.77	
Pumping Stations		2,245,383.97	
Purification System		124,613.33	
Transmission and Distributing System		44,481,783.30	
General Structures and Equipment		4,878,234.63	
Owens Valley Light and Power System		782,354.14	
Interest During Construction		3,782,904.22	
Construction Work in Progress		1,493,399.44	$105,013,950.35
CONSTRUCTION FUNDS:			
Cash with City Treasurer			2,712,315.42
BOND INTEREST AND SINKING FUNDS:			
Cash with City Treasurer:			
For Payment of Matured Bonds and Coupons	$ 667,359.77		
For Future Maturities	5,548,145.17		6,215,504.94
POWER REVENUE FUND, CURRENT ACCOUNT			151,509.40
CONSTRUCTION MATERIALS AND SUPPLIES			1,469,489.84
ACCOUNTS AND NOTES RECEIVABLE:			
Consumers	$ 576,856.76		
Miscellaneous Accounts Receivable	281,784.26		
Notes Receivable	286,045.37		
	$ 1,144,686.39		
Less: Reserve for Doubtful Accounts	80,118.90		1,064,567.49
CASH ON HAND AND WITH CITY TREASURER:			
Water Revenue Fund	$ 1,270,066.41		
St. Francis Dam Claim Fund	14,458.20		
Funding Bond (Santa Clara Valley Damages) Fund	12,779.72		1,297,304.33
DEFERRED CHARGES:			
Undistributed Expenditures	$ 135,482.84		
Deposit with Superior Court of Kern Co.	14,221.61		149,704.45
			$118,074,346.22

Exhibit II

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF WATER WORKS AND SUPPLY
BALANCE SHEET
JUNE 30, 1929

LIABILITIES

BONDS OUTSTANDING (EXHIBIT V):		
Serial Bonds, Unmatured:		
General Water Works	$44,905,600.00	
City of Eagle Rock Water Works	78,000.00	
Funding Bonds (Santa Clara Valley Damages)	2,500,000.00	
Water Works Improvement Districts	6,315,000.00	
	$53,798,600.00	
Matured Bonds Not Presented for Paym't	175,000.00	$ 53,973,600.00
ACCRUED INTEREST ON BONDS:		
Matured Coupons Not Presented for Payment	$ 492,359.77	
Accrued But Not Due	607,397.21	1,099,756.98
WARRANTS (SANTA CLARA VALLEY DAMAGES)		1,637,429.83
PURCHASE MONEY OBLIGATIONS		374,441.27
ACCOUNTS PAYABLE:		
Consumers' Deposits	$ 574,595.19	
Invoices Payable	380,679.32	
Accrued Pay Rolls	206,714.08	1,161,988.59
DEFERRED CREDITS:		
Unamortized Premium on Bonds	$ 90,219.75	
Land Rentals Received in Advance	30,435.91	120,655.66
RESERVE FOR DEPRECIATION		15,062,818.66
INVESTMENT OF THE CITY OF LOS ANGELES (EXHIBIT IV):		
Allocation From Taxes For Bond Redemption and Interest Requirements	$32,304,098.23	
Appropriations For Special Purposes	2,192,787.09	
Donations in Aid of Construction	12,413,090.67	
Surplus Arising From Operations	13,692,397.52	
	$60,602,373.51	
Deduct:		
Water Furnished Other Departments Not Paid For	$ 8,150,234.47	
Ascertained Losses Resulting From St. Francis Dam Disaster	7,808,483.81	
	$15,958,718.28	44,643,655.23
		$118,074,346.22

NOTE:—No provision has been made for liabilities in connection with the St. Francis Dam disaster not ascertained at June 30, 1929.

Exhibit III

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF WATER WORKS AND SUPPLY
INCOME ACCOUNT FOR THE YEAR ENDING JUNE 30, 1929

GROSS OPERATING REVENUE:		
Water Sales:		
Residential	$ 4,601,762.29	
Commercial	2,440,334.37	
Industrial	169,809.22	
Governmental — Including $786,179.78 Not Paid For (See Below)	1,054,479.51	
Irrigation	788,511.89	
Light and Power, Owens Valley	291,415.65	
Miscellaneous	24,454.30	$ 9,370,767.23
DEDUCT:—OPERATING EXPENSES:		
Source of Water Supply	$ 257,413.65	
Pumping	553,953.85	
Purification	97,832.24	
Transmission and Distribution	1,151,699.38	
Light and Power, Owens Valley	119,104.09	
Commercial	456,936.81	
Taxes On Property, Outside The City	173,935.88	
General	826,797.29	3,637,673.19
Net Operating Revenue		$ 5,733,094.04
ADD:		
Non-Operating Revenue, Net	$ 123,086.38	
Profit On Sale of Land	10,411.36	133,497.74
Net Income Before Interest, Depreciation, Etc.		$ 5,866,591.78
DEDUCT:		
Interest Paid and Accrued:		
General Water Works Bonds	$ 1,895,371.74	
City of Eagle Rock Water Works Bonds Funding Bonds (Santa Clara Valley Damages)	4,029.08	
	29,146.85	
Water Works Improvement District Bonds	346,919.12	
Other Interest	6,342.48	
	$ 2,281,809.27	
Less: Interest Received	142,816.32	
	$ 2,138,992.95	
Provision For Depreciation of Plant and System	1,754,568.35	
Miscellaneous Charges and Adjustments	125,731.96	4,019,293.26
Net Income For Year		$ 1,847,298.52
Deduct: Municipal Water Not Paid For (See Above)		786,179.78
Net Income, Excluding Credit For Municipal Water Not Paid For		$ 1,061.118.74

Exhibit IV

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF WATER WORKS AND SUPPLY
INVESTMENT OF THE CITY OF LOS ANGELES

	Balances June 30, 1928	Additions During Year	Balances June 30, 1929
ALLOCATION FROM TAXES FOR BOND REDEMPTION AND INTEREST REQUIREMENTS:			
General Water Works Bonds	$24,872,826.66	$ 959,031.81	$25,831,858.47
City of Eagle Rock Water Works Bonds	8,672.71	.....	8,672.71
Funding Bonds (Santa Clara Valley Damages)	.....	700,000.00	700,000.00
Water Works Improvement District Bonds	5,312,076.42	606,490.63	5,918,567.05
	$30,193,575.79	$ 2,265,522.44	$32,459,098.23
Less: Payments to General Fund of City	.....	155,000.00	155,000.00
	$30,193,575.79	$ 2,110,522.44	$32,304,098.23
APPROPRIATIONS FOR SPECIAL PURPOSES:			
St. Francis Dam Disaster	$ 2,025,000.00	$ 135,000.00	$ 2,160,000.00
Sundry	.....	32,787.09	32,787.09
	$ 2,025,000.00	$ 167,787.09	$ 2,192,787.09
DONATIONS IN AID OF CONSTRUCTION:			
Street Main Assessments	$ 5,477,637.74	$ 528,943.91	$ 6,006,581.65
Service Installations	3,596,289.11	350,617.58	3,946,906.69
Meter Installations	289,231.82	74,770.21	364,002.03
Fire Hydrant Installations	486,598.78	184,053.35	670,652.13
Water Systems Donated (As Appraised by Department Engineers)	1,366,824.90	47,812.06	1,414,636.96
Owens Valley Light and Power System	4,601.75	5,709.46	10,311.21
	$11,221,184.10	$ 1,191,906.57	$12,413,090.67
SURPLUS ARISING FROM OPERATIONS:			
Balance, Excluding Credit For Municipal Water Not Paid For	$ 4,481,044.31	$ 1,061,118.74	$ 5,542,163.05
Credit For Municipal Water Not Paid For	7,364,054.69	786,179.78	8,150,234.47
	$11,845,099.00	$ 1,847,298.52	$13,692,397.52
Total Credits	$55,284,858.89	$ 5,317,514.62	$60,602,373.51
DEDUCT:			
Water Furnished Other City Departments Not Paid For	$ 7,364,054.69	$ 786,179.78	$ 8,150,234.47
Ascertained Losses Resulting From St. Francis Dam Disaster	2,939,307.48	4,869,176.33	7,808,483.81
Total Charges	$10,303,362.17	$ 5,655,356.11	$15,958,718.28
Investment of the City of Los Angeles	$44,981,496.72	$ 337,841.49*	$44,643,655.23

*Credit

CITY OF LOS ANGELES—DEPARTMENT OF WATER AND POWER—DIVISION OF WATER WORKS AND SUPPLY
STATEMENT OF WATER WORKS BONDS—JUNE 30, 1929

	Authorized	Date of Issue	Interest Rate %	Sold	Matured	Outstanding
GENERAL WATER WORKS:						
1895	$ 30,000.	July 1, 1895	4½	$ 30,000.	$ 24,750.	$ 5,250.
1901	2,000,000.	Oct. 1, 1901	3¾	2,000,000.	1,350,000.	650,000.
1904 Reservoir	150,000.	June 1, 1904	3¾	150,000.	93,750.	56,250.
1904	337,500.	June 1, 1904	3¾	337,500.	312,500.	25,000.
1905	1,500,000.	Nov. 1, 1905	4	1,500,000.	862,500.	637,500.
1907	23,000,000.	Dec. 1, 1907	4	1,033,600.	456,000.	577,600.
		Dec. 1, 1907	4½	21,964,000.	9,690,000.	12,274,000.
1913	1,500,000.	May 1, 1913	4½	1,500,000.	550,000.	950,000.
1922	5,000,000.	Jan. 1, 1923	4¼	1,000,000.	.....	1,000,000.
	.....	Jan. 1, 1923	4½	3,000,000.	600,000.	2,400,000.
	.....	Feb. 1, 1923	5	1,000,000.	150,000.	850,000.
1924	8,000,000.	June 1, 1924	4¾	6,000,000.	750,000.	5,250,000.
	.....	June 1, 1924	4½	2,000,000.	250,000.	1,750,000.
1925	8,000,000.	July 1, 1925	4½	3,000,000.	225,000.	2,775,000.
	.....	July 1, 1925	4¾	5,000,000.	375,000.	4,625,000.
1925 Colorado River	2,000,000.	Dec. 1, 1925	4½	500,000.	42,000.	458,000.
	.....	Dec. 1, 1926	4½	500,000.	28,000.	472,000.
	.....	July 1, 1928	4½	500,000.	.....	500,000.
1926	10,000,000.	Nov. 1, 1926	4½	6,000,000.	300,000.	5,700,000.
	.....	Nov. 1, 1926	4	1,000,000.	50,000.	950,000.
	.....	July 1, 1928	4½	500,000.	.....	500,000.
	.....	Mar. 1, 1929	4¾	2,500,000.	.....	2,500,000.
	$61,517,500.			$61,015,100.	$16,109,500.	$44,905,600.
CITY OF EAGLE ROCK WATER WORKS:						
1916	$ 70,000.	Jan. 2, 1917	5	$ 70,000.	$ 24,000.	$ 46,000.
1921	40,000.	Apr. 1, 1921	6	40,000.	8,000.	32,000.
	$ 110,000.			$ 110,000.	$ 32,000.	$ 78,000.
FUNDING BONDS (SANTA CLARA VALLEY DAMAGES):						
Series No. 1	$ 500,000.	Oct. 1, 1928	4¾	$ 500,000.	.....	$ 500,000.
Series No. 2	2,000,000.	Oct. 1, 1928	5	2,000,000.	.....	2,000,000.
	$ 2,500,000.			$ 2,500,000.	.....	$ 2,500,000.
IMPROVEMENT DISTRICTS:						
Los Angeles County Water Works District No. 3	$ 2,604,000.	Feb. 1, 1916	6	$ 2,604,000.	$ 924,000.	$ 1,680,000.
Municipal Improvement District No. 1	1,020,000.	Dec. 1, 1916	5	1,020,000.	612,000.	408,000.
No. 2	390,000.	Dec. 1, 1916	5	390,000.	156,000.	234,000.
No. 3	200,000.	Dec. 1, 1916	5	116,000.	60,000.	56,000.
No. 9	150,000.	Dec. 1, 1923	5½	150,000.	20,000.	130,000.
No. 11	700,000.	Dec. 1, 1919	5¼	700,000.	180,000.	520,000.
No. 18	100,000.	Dec. 1, 1923	5½	100,000.	15,000.	85,000.
No. 19	275,000.	Dec. 1, 1923	5½	275,000.	35,000.	240,000.
No. 23	250,000.	May 1, 1924	5½	250,000.	35,000.	215,000.
No. 27	776,000.	Oct. 1, 1924	5½	776,000.	84,000.	692,000.
No. 35	275,000.	Jan. 1, 1925	5½	275,000.	28,000.	247,000.
No. 36	1,300,000.	Feb. 1, 1925	5¼	792,000.	132,000.	660,000.
	.....	Feb. 1, 1925	5	508,000.	.....	508,000.
No. 52	200,000.	Apr. 1, 1928	5¾	200,000.	5,000.	195,000.
No. 53	195,000.	Apr. 1, 1928	6	195,000.	5,000.	190,000.
No. 54	115,000.	Aug. 1, 1928	6	115,000.	.....	115,000.
No. 58	140,000.	Dec. 1, 1928	6	140,000.	.....	140,000.
	$ 8,690,000.			$ 8,606,000.	$ 2,291,000.	$ 6,315,000.
	$72,817,500.			$72,231,100.	$18,432,500.	$53,798,600.
MATURED BONDS NOT PRESENTED FOR PAYMENT AT JUNE 30, 1929:						
1904 Reservoir					$ 3,000.	.....
1907					2,000.	.....
1924					165,000.	.....
Municipal Improvement District No. 11					5,000.	175,000.
TOTAL BONDS OUTSTANDING JUNE 30, 1929, PER (EXHIBIT II)						$53,973,600.

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF WATER WORKS AND SUPPLY

—0—

STATEMENT OF RESOURCES AVAILABLE AND DISPOSITION THEREOF

YEAR ENDING JUNE 30, 1929

RESOURCES AVAILABLE:		
Bonds sold (including $12,764.00 premium):		
General water works	$3,500,003.00	
Funding bonds (Santa Clara Valley damages)	2,512,205.00	
Water works improvement districts	255,556.00	$ 6,267,764.00
Warrants issued and outstanding (Santa Clara Valley damages)		1,637,429.83
Donations in aid of construction		1,191,906.57
Allocated from taxes for bond redemption and interest requirements:		
General water works bonds	$ 959,031.81	
Funding bonds	700,000.00	
Improvement district bonds	606,490.63	2,265,522.44
Appropriated from Reserve Fund of City:		
On account of St. Francis Dam disaster—(including $750,000.00 received on account of appropriation made during year ending June 30, 1928)	$ 885,000.00	
Other appropriations	32,787.09	917,787.09
Funds derived from operations:		
Net income, excluding credit for municipal water not paid for	$1,061,118.74	
Provision for depreciation of plant and system	1,857,182.80	
	$2,918,301.54	
Less: Proportion of bond premium amortized	7,340.96	2,910,960.58
Increase in purchase money obligations		230,707.48
Decrease in working capital (per accompanying table)		185,429.38
TOTAL		$15,607,507.37

ACCOUNTED FOR AS FOLLOWS:		
Additions to plant and system (net)		$ 5,248,738.98
Expenditures for replacements, etc.		442,408.81
St. Francis Dam disaster:		
Claims paid	$4,124,650.11	
Relief and rehabilitation expenditures	744,526.22	4,869,176.33
Bonds matured		1,825,900.00
Payments to General Fund of City		155,000.00
Increase in construction funds with City Treasurer		2,179,073.65
Increase in net assets of bond interest and sinking funds (per accompanying table)		887,209.60
As above		$15,607,507.37

COMPARISON OF WORKING AND CURRENT ASSETS AND CORRESPONDING LIABILITIES

	June 30, 1928	June 30, 1929
ASSETS:		
Materials and supplies	$1,660,418.54	$ 1,469,489.84
Accounts and notes receivable	1,141,528.81	1,064,567.49
Power Revenue Fund—current account	125,397.74	151,509.40
Cash	1,109,955.59	1,297,304.33
Deferred charges	281,697.12	149,704.45
	$4,318,997.80	$4,132,575.51
LIABILITIES:		
Accounts payable	$1,162,172.09	$1,161,988.59
Land rentals received in advance	31,245.32	30,435.91
	$1,193,417.41	$ 1,192,424.50
Difference, representing working capital	$3,125,580.39	$2,940,151.01
Decrease therein		$ 185,429.38

COMPARISON OF NET ASSETS OF BOND INTEREST AND SINKING FUNDS

	June 30, 1928	June 30, 1929
ASSETS (Cash)	$5,120,013.72	$ 6,215,504.94
LIABILITIES:		
Matured bonds not presented	$ 120,000.00	$ 175,000.00
Accrued interest	946,475.36	1,099,756.98
	$1,066,475.36	$ 1,274,756.98
Net Assets	$4,053,538.36	$4,940,747.96
Increase therein	$ 887,209.60	

Exhibit VII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

WATER WORKS BOND ELECTION 1925 FUND
(Colorado River Supply)

CASH TRANSACTIONS

FROM DECEMBER, 1925, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 1,500,000.00	
Miscellaneous Collections	49,399.00	
TOTAL RECEIPTS		$ 1,549,399.00

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Prior to July 1, 1928—Nos. 1 to 423, Inclusive, (No. 409 Cancelled) and Demands Fiscal Year 1928-1929, Nos. 1 to 1210, Inclusive	1,299,094.81
CASH BALANCE ON HAND JUNE 30, 1929	$ 250,304.19

Exhibit VIII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

WATER WORKS BOND ELECTION 1926 FUND

CASH TRANSACTIONS

FROM DECEMBER 1, 1926, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$10,000,000.00	
Miscellaneous Collections	18,487.68	
TOTAL RECEIPTS		$10,018,487.68

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Prior to July 1, 1928—Nos. 1 to 28, Inclusive and Demands Fiscal Year 1928-1929—Nos. 1 to 117, Inclusive	8,628,193.37
CASH BALANCE ON HAND JUNE 30, 1929	$ 1,390,294.31

Exhibit IX

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

MUNICIPAL IMPROVEMENT DISTRICT NO. 27 BOND FUND

CASH TRANSACTIONS

FROM DECEMBER, 1924, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 776,000.00	
Miscellaneous Collections	74,819.51	
TOTAL RECEIPTS		$ 850,819.51

DISBURSEMENTS

Demands Drawn on City Treasurer:

TOTAL DISBURSEMENTS, Demands Nos. 1 to 4, Inclusive	776,000.00
CASH BALANCE ON HAND JUNE 30, 1929	$ 74,819.51

Exhibit X

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

MUNICIPAL IMPROVEMENT DISTRICT NO. 35 BOND FUND

CASH TRANSACTIONS

FROM APRIL, 1925, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 275,000.00	
Miscellaneous Collections	37,361.81	
TOTAL RECEIPTS		$ 312,361.81

DISBURSEMENTS

Demands Drawn on City Treasurer:

TOTAL DISBURSEMENTS, Demands Nos. 1 and 2	275,000.00
CASH BALANCE ON HAND JUNE 30, 1929	$ 37,361.81

Exhibit XI

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

MUNICIPAL IMPROVEMENT DISTRICT NO. 36 BOND FUND

CASH TRANSACTIONS

FROM APRIL, 1925, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 1,300,000.00	
Miscellaneous Collections	638,323.13	
TOTAL RECEIPTS		$ 1,938,323.13

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Nos. 1 and 2	1,300,000.00
CASH BALANCE ON HAND JUNE 30, 1929	$ 638,323.13

Exhibit XII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

MUNICIPAL IMPROVEMENT DISTRICT NO. 52 BOND FUND

CASH TRANSACTIONS

FROM MAY 1, 1928, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 200,000.00

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Prior to July 1, 1928—No. 1 and Demands Fiscal Year 1928-1929—Nos. 1 to 12, Inclusive	156,921.47
CASH BALANCE ON HAND JUNE 30, 1929	$ 43,078.53

Exhibit XIII

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
MUNICIPAL IMPROVEMENT DISTRICT NO. 53 BOND FUND
CASH TRANSACTIONS
FROM MAY 1, 1928, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 195,000.00

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Prior to July 1, 1928—Nos. 1 and 2, and Demands Fiscal Year 1928-1929—Nos. 1 to 3, Inclusive	99,288.09
CASH BALANCE ON HAND JUNE 30, 1929	$ 95,711.91

Exhibit XIV

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
MUNICIPAL IMPROVEMENT DISTRICT NO. 54 BOND FUND
CASH TRANSACTIONS
FROM OCTOBER, 1928, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$ 115,000.00	
Miscellaneous Collections	6.52	
TOTAL RECEIPTS		$ 115,006.52

DISBURSEMENTS

Demands Drawn on City Treasurer:	
TOTAL DISBURSEMENTS, Demands Nos. 1 to 4 Inclusive	46,957.97
CASH BALANCE ON HAND JUNE 30, 1929	$ 68,048.55

Exhibit XV

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
MUNICIPAL IMPROVEMENT DISTRICT NO. 58 BOND FUND
CASH TRANSACTIONS
FROM JANUARY, 1929, TO JUNE 30, 1929

RECEIPTS	
Sale of Bonds	$ 140,000.00
DISBURSEMENTS	
Demands Drawn on City Treasurer: TOTAL DISBURSEMENTS, Demands Nos. 1 to 6, Inclusive	25,626.52
CASH BALANCE ON HAND JUNE 30, 1929	$ 114,373.48

Exhibit XVI

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
POWER REVENUE FUND
CASH TRANSACTIONS
YEAR ENDING JUNE 30, 1929

Balance in Fund July 1, 1928		$ 1,433,888.50
RECEIPTS		
Returned to Fund Account of Cancellation of Demand Checks Covering Payroll Deductions	$ 53,464.27	
Consumers' Accounts	14,381,916.31	
Miscellaneous Collections	39,194.71	
Deposits Returnable	9,757.40	
Bills Collectible	2,715,542.34	
*TOTAL RECEIPTS		17,199,875.03
TOTAL RECEIPTS AND CASH ON HAND		$18,633,763.53
DISBURSEMENTS		
Demands Drawn on City Treasurer:		
Salaries and Wages	$ 3,772,115.22	
Materials and Supplies	3,008,651.92	
Outside Services and Personal Expenses	1,811,369.84	
Land and Building Purchases	85,005.50	
Bond Interest and Redemption Requirements	3,147,341.61	
Purchased Energy	3,535,408.55	
Taxes	47,623.72	
City of Los Angeles General Fund	750,000.00	
Refunds and Miscellaneous Items	504,085.65	
TOTAL DISBURSEMENTS		16,661,602.01
Cash on Hand June 30, 1929:		
Cashier	$ 306,791.41	
City Treasurer	1,665,370.11	
		$ 1,975,161.52

*—Included in Total Receipts is an amount of $4,319,728.98 received on Internal Demands.

Exhibit XVII

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF POWER AND LIGHT

BALANCE SHEET
JUNE 30, 1929

ASSETS

PLANT AND EQUIPMENT:			
Lands		$ 7,496,506.31	
Power Plants and Connecting Waterways, Less Credit From Water Revenue Fund For Construction of Joint Waterways		10,876,458.39	
Transmission System		5,460,779.61	
Distribution System		35,367,211.60	
Utilization Equipment		1,515,242.45	
General Structures and Equipment		2,630,492.13	
Construction Work in Progress		2,309,768.19	$65,656,458.68
CONSTRUCTION FUNDS:			
Cash on Hand and With City Treasurer			1,064,193.56
BOND INTEREST AND SINKING FUNDS:			
Cash With City Treasurer:			
For Payment of Matured Bonds and Coupons	$	159,852.50	
For Future Maturities		3,324,641.70	3,484,494.20
CONSTRUCTION MATERIALS AND SUPPLIES			2,148,036.71
ACCOUNTS RECEIVABLE:			
Consumers	$	845,537.15	
Miscellaneous		118,519.47	
	$	964,056.62	
Less: Reserve for Doubtful Accounts		23,181.68	940,874.94
REVENUE FUNDS:			
Cash on Hand and With City Treasurer			1,996,611.52
DEFERRED CHARGES:			
Preliminary Engineering and Similar Expense	$	306,430.66	
Miscellaneous		55,064.42	361,495.08
			$75,652,164.69

Exhibit XVII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

DIVISION OF POWER AND LIGHT

BALANCE SHEET

JUNE 30, 1929

LIABILITIES

ELECTRIC PLANT BONDS (EXHIBIT XIX):		
Serial Bonds, Unmatured	$40,527,000.00	
Matured Bonds Not Presented For Payment	86,000.00	$40,613,000.00
ACCRUED INTEREST ON BONDS:		
Matured Coupons Not Presented For Payment	$ 73,852.50	
Accrued But Not Due	589,937.92	663,790.42
PURCHASE MONEY OBLIGATIONS		45,545.55
WATER REVENUE FUND, CURRENT ACCOUNT		151,509.40
ACCOUNTS PAYABLE:		
Southern California Edison Company	$ 240,071.30	
Others	323,247.18	
Extension Deposits	527,452.23	
Accrued Pay Rolls	165,044.47	1,255,815.18
UNAMORTIZED PREMIUM ON BONDS		218,346.55
RESERVE FOR DEPRECIATION		4,943,148.38
INVESTMENT FROM PROCEEDS OF TAXATION		3,736,759.46
SURPLUS ARISING FROM OPERATIONS:		
Balance June 30, 1928	$20,397,277.52	
Net Income, Year Ending June 30, 1929 (Exhibit XVIII)	3,626,972.23	24,024,249.75
		$75,652,164.69

Exhibit XVIII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

DIVISION OF POWER AND LIGHT

INCOME ACCOUNT FOR THE YEAR ENDING JUNE 30, 1929

GROSS INCOME:		
General Consumers, Lighting	$ 8,428,375.17	
General Consumers, Power	3,854,993.86	
Governmental Consumers, Lighting	2,080,991.45	
Governmental Consumers, Power	242,262.84	
Miscellaneous Electric Revenues	32,736.69	
Other Income	98,402.57	$14,737,762.58
DEDUCT: EXPENSES:		
Production	$ 178,410.10	
Transmission	238,499.38	
Power Purchased	3,422,642.37	
Distribution	1,303,008.53	
Utilization	467,973.74	
Commercial	887,340.72	
General	1,030,204.39	7,528,079.23
Net Income Before Interest, Depreciation, Etc.		$ 7,209,683.35
DEDUCT:		
Interest Paid and Accrued..$1,855,045.86		
Less: Interest Received 93,565.22	$ 1,761,480.64	
Provision For Depreciation of Plant and Equipment	1,567,832.00	
Miscellaneous Charges and Adjustments (Net)	253,398.48	3,582,711.12
Net Income (Exhibit XVII)		$ 3,626,972.23

Exhibit XIX

CITY OF LOS ANGELES—DEPARTMENT OF WATER AND POWER—DIVISION OF POWER AND LIGHT
STATEMENT OF BONDED DEBT—JUNE 30, 1929

Electric Plant Bond Election	Authorized	Date of Issue	Interest Rate %	Sold	Matured	Outstanding
1910	$ 3,500,000.00	June 1, 1911	4½	$3,500,000.00	$1,300,000.00	$2,200,000.00
1914	6,500,000.00	Aug. 1, 1914	4½	6,500,000.00	3,000,000.00	3,500,000.00
1919	13,500,000.00	Aug. 1, 1921	5	13,500,000.00	1,125,000.00	12,375,000.00
1924	16,000,000.00	Oct. 1, 1924	4½	8,000,000.00	800,000.00	7,200,000.00
		Oct. 1, 1925	4½	4,000,000.00	300,000.00	3,700,000.00
		Oct. 1, 1926	4½	2,000,000.00	100,000.00	1,900,000.00
		Oct. 1, 1926	4½	500,000.00	28,000.00	472,000.00
		Oct. 1, 1927	4½	1,500,000.00	38,000.00	1,462,000.00
1926	11,000,000.00	Nov. 1, 1926	4½	2,000,000.00	100,000.00	1,900,000.00
		Nov. 1, 1926	4½	1,000,000.00	56,000.00	944,000.00
		Nov. 1, 1926	4	2,500,000.00	126,000.00	2,374,000.00
		July 1, 1928	4½	500,000.00	.....	500,000.00
		July 1, 1928	4½	2,000,000.00	.....	2,000,000.00
	$50,500,000.00			$47,500,000.00	$6,973,000.00	$40,527,000.00

Matured Bonds not presented for payment at June 30, 1929:		
1910 Electric Plant	$ 85,000.00	
1919 Electric Plant	1,000.00	$ 86,000.00
Total Bonds Outstanding June 30, 1929, (Per Exhibit XVII)		$40,613,000.00

Exhibit XX

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF POWER AND LIGHT

SUMMARY OF RESOURCES AVAILABLE AND DISPOSITION THEREOF

YEAR ENDING JUNE 30, 1929

RESOURCES AVAILABLE:	
Net Income For the Year Ending June 30, 1929 Exhibit XVIII	$ 3,626,972.23
Add: Provision For Depreciation of Plant and Equipment	1,609,875.00
	$ 5,236,847.23
Deduct: Proportion of Bond Premium Amortized	14,066.01
Funds Derived From Operations	$ 5,222,781.22
Bonds Sold, 1926 Issue (Including $2,199.00 Premium)	2,502,199.00
Decrease in Construction Funds With City Treasurer	269,868.13
Appropriated From Reserve Fund of City (Power and Light Portion)	20,000.00
Total	$ 8,014,848.35
ACCOUNTED FOR AS FOLLOWS:	
Additions to Plant and Equipment (Net)	$ 4,296,999.57
Expenditures For Replacements, Etc.	646,586.28
Expenditures For Repairs to Power Plant No. 2 and Aqueduct Guarding Expense Charged to Reserve For Contingencies	320,000.00
Bonds Matured	1,268,000.00
Decrease in Purchase Money Obligations	73,350.50
Authorized Payment Into General Fund of City	20,000.00
Increase in Working Capital (Per Accompanying Table)	1,316,909.07
Increase in Net Assets of Bond Interest and Sinking Funds (Per Accompanying Table)	73,002.93
As Above	$ 8,014,848.35

Exhibit XX

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF POWER AND LIGHT

SUMMARY OF RESOURCES AVAILABLE AND DISPOSITION THEREOF

YEAR ENDING JUNE 30, 1929

COMPARISON OF WORKING AND CURRENT ASSETS AND CORRESPONDING LIABILITIES

	June 30,1928	June 30, 1929
ASSETS:		
Materials and supplies	$2,733,564.73	$ 2,148,036.71
Accounts receivable	922,635.13	940,874.94
Cash	1,453,338.50	1,996,611.52
Deferred charges	305,227.40	361,495.08
	$5,414,765.76	$ 5,447,018.25
LIABILITIES:		
Accounts payable	$1,816,583.42	$1,255,815.18
General Fund of City	750,000.00	—
Water Revenue Fund	125,397.74	151,509.40
	$2,691,981.16	$ 1,407,324.58
Difference, representing working capital	$2,722,784.60	$ 4,039,693.67
Increase therein	$1,316,909.07	

COMPARISON OF NET ASSETS OF BOND INTEREST AND SINKING FUNDS

	June 30, 1928	June 30, 1929
ASSETS (Cash)	$3,381,642.52	$ 3,484,494.20
LIABILITIES:		
Matured bonds not presented	$ 101,000.00	$ 86,000.00
Accrued interest	618,941.67	663,790.42
	$ 719,941.67	$ 749,790.42
Net Assets	$2,661,700.85	$ 2,734,703.78
Increase therein	$ 73,002.93	

Exhibit XXI

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
DIVISION OF POWER AND LIGHT

STATEMENT OF EARNINGS, EXPENSES, INTEREST AND SURPLUS
FROM COMMENCEMENT OF OPERATIONS TO JUNE 30, 1929

Compiled from reports of audits made by Price, Waterhouse & Co.

	REVENUES			Maintenance and Operation Expense	De-preciation	Operating Balance	Interest on Bonds and Other Interest	Other Deductions	Surplus
	Gross From Municipal System	Net From Operating Agreement	Total						
Per. end June 30, 1918 (Approx. 15 Months)	$ 308,134.21	$ 700,219.12	$ 1,008,353.33	$ 371,416.97	$ 113,803.00	$ 523,133.36	$ 447,826.88	$ 1,012.73	$ 74,293.75
Yr. end. June 30, 1919	496,782.16	660,780.30	1,157,562.46	462,011.34	99,917.00	595,634.12	352,961.25	26,169.46	216,503.41
Yr. end. June 30, 1920	633,332.86	671,510.16	1,304,843.02	487,478.52	125,066.00	692,298.50	348,501.60	32,494.13	311,302.77
Yr. end. June 30, 1921	913,010.36	1,562,539.88	2,475,550.24	671,720.12	180,609.84	1,623,220.28	372,006.13	47,983.55	1,203,230.60
Yr. end. June 30, 1922	1,650,222.82	1,928,789.08	3,579,011.90	995,898.88	176,593.82	2,406,519.20	432,915.70	49,353.61	1,924,249.89
Yr. end. June 30, 1923	7,762,606.97	.....	7,762,606.97	3,439,055.33	622,029.00	3,701,522.64	1,007,899.30	.....	2,693,623.34
Yr. end. June 30, 1924	9,302,092.29	.....	9,302,092.29	4,476,738.65	732,750.00	4,092,603.64	1,041,297.19	.....	3,051,306.45
Yr. end. June 30, 1925	9,836,402.33	.....	9,836,402.33	5,136,984.70	1,035,709.00	3,663,708.63	* 927,740.87	.....	2,735,967.76
Yr. end. June 30, 1926	11,237,158.89	.....	11,237,158.89	5,836,131.18	1,186,106.00	4,214,921.71	1,418,468.85	.....	2,796,452.86
Yr. end. June 30, 1927	12,658,994.82	.....	12,658,994.82	6,504,885.91	1,321,181.00	4,832,927.91	1,574,439.48	.....	3,258,488.43
Yr. end. June 30, 1928	13,558,049.44	.....	13,558,049.44	7,023,274.13	1,442,026.00	5,092,749.31	1,756,213.73	†1,204,677.32	2,131,858.26
Yr. end. June 30, 1929	14,737,762.58	.....	14,737,762.58	7,528,079.23	1,567,832.00	5,641,851.35	1,761,480.64	253,398.48	3,626,972.23
TOTAL	$83,094,549.73	$5,523,838.54	$88,618,388.27	$42,933,674.96	$8,603,622.66	$37,081,090.65	$11,441,751.62	$1,615,089.28	$24,024,249.75

In addition to the above surplus of $24,024,249.75 there has been raised for power purposes from proceeds of taxation the sum of $3,736,759.46, giving a total equity in Plant and Equipment of $27,761,009.21.

*—Interest charge for the year was $1,108,823.12, from which has been deducted, for purposes of this statement, Sinking Fund Earnings prior to June 30, 1924, of $181,082.25.

†—Includes Losses and Expenses arising from St. Francis Dam Disaster, amounting to $929,870.65, which was charged direct to Surplus Account.

Exhibit XXII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

ELECTRIC PLANT BOND ELECTION 1924 FUND

CASH TRANSACTIONS

FROM JUNE 1, 1924, TO MAY 31, 1929

RECEIPTS

Sale of Bonds	$16,000,000.00	
Miscellaneous Collections	1,380,543.02	
TOTAL RECEIPTS		$17,380,543.02

DISBURSEMENTS

Demands drawn on City Treasurer:		
TOTAL DISBURSEMENTS, Demands prior to July 1, 1928—Nos. 1 to 193, inclusive, and Demands July 1, 1929, to May 31, 1929—Nos. 1 to 523, inclusive	$17,380,543.04	
Less: Demands Cancelled (No. 377)	.02	
TOTAL DISBURSEMENTS		$17,380,543.02

Exhibit XXIII

CITY OF LOS ANGELES

DEPARTMENT OF WATER AND POWER

ELECTRIC PLANT BOND ELECTION 1926 FUND

CASH TRANSACTIONS

FROM DECEMBER 1, 1926, TO JUNE 30, 1929

RECEIPTS

Sale of Bonds	$8,000,000.00	
Miscellaneous Collections	1,993,113.58	
TOTAL RECEIPTS		$ 9,993,113.58

DISBURSEMENTS

Demands drawn on City Treasurer:			
TOTAL DISBURSEMENTS, Demands prior to July 1, 1928—Nos. 1 to 2146, inclusive, and Demands Fiscal Year 1928-1929—Nos. 1 to 1965, inclusive	$8,934,019.97		
Less: Demands and Time Vouchers Cancelled		99.95	8,933,920.02
CASH BALANCE ON HAND JUNE 30, 1929			$ 1,059,193.56