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MUNICIPAL WATER AND POWER BUILDING
HARBOR DISTRICT

TWENTY-SECOND
ANNUAL REPORT
OF THE
BOARD OF PUBLIC SERVICE
COMMISSIONERS
OF THE
CITY OF LOS ANGELES
—
FOR THE FISCAL YEAR ENDING
JUNE 30, 1923

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BOARD OF PUBLIC SERVICE

COMMISSIONERS

CITY OF LOS ANGELES

OFFICE OF THE CITY CLERK

LOS ANGELES, CALIF.

Twenty - second Annual Report

of the

**Board of Public Service
Commissioners**

of the

**City of Los Angeles
CALIFORNIA**

*for the Fiscal Year
ending June 30, 1923*



**Bureau of Water Works and Supply
Bureau of Power and Light**

COMMISSIONERS

R. F. DEL VALLE, President

JAS. B. BAKER
JOHN A. BURTON

C. A. DYKSTRA
JOHN R. HAYNES

SECRETARY OF BOARD

JAS. P. VROMAN

CHIEF ENGINEER
WM. MULHOLLAND

CHIEF ELECTRICAL ENGINEER
E. F. SCATTERGOOD

CONTROLLER

L. M. ANDERSON

W
 TD
 225
 28
 AN7
 1922/23

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. Stephens, 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 Erkenbreker	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,
C. A. Dykstra	January, 1923,
Jno. A. Burton	February, 1923,



R.F. DEL VALLE

PRESIDENT



JAMES B. BAKER



JOHN R. HAYNES

BOARD of
PUBLIC SERVICE
COMMISSIONERS

1923



JOHN A. BURTON



C.A. DYKSTRA



COVERED CONDUIT. FREEMAN DIVISION, LOS ANGELES AQUEDUCT.

Letter to City Council

Los Angeles, Cal., July 15, 1923.

To the Honorable, the Council of the
City of Los Angeles.

Gentlemen:

The Board of Public Service Commissioners herewith respectively submits its Twenty-second Annual Report, for the fiscal year ending June 30, 1923.

During the year the Board lost by death, one of its esteemed members, Mr. A. G. Bartlett, and Mr. John A. Burton was appointed as his successor.

As is well known, the great activities of the City of Los Angeles, in all branches, have been steadily increasing, and it has been some problem for the Public Service Department to keep up with the demands for water, power and light, made upon it. It is believed, however, that a study of the attached reports of the heads of departments, in the Bureau of Water Works and Supply and Bureau of Power and Light, will be convincing as to the immense progress made, even during a year of unparalleled growth of the City.

In reviewing the work accomplished by the Bureau of Water Works and Supply as set forth by the report of the Chief Engineer, particular attention is called to the extraordinary growth of the City for the past several years and this condition has not only been maintained but has been actually accelerated during the year just closed. This fact is best illustrated by the following comparisons.

Services installed this year for domestic purposes amounted to 20,568, as compared with 16,759 for the previous year or an increase of 28.7 per cent while there were 207.72 miles of mains laid as against 116.54 miles for the preceding year or an increase of approximately 80 per cent. Applying the ratio of 4.8 inhabitants per service, this would indicate an increase in population of approximately 100,000 people.

Work was continued throughout the year on the Stone Canyon Dam, 253,900 cubic yards of earth having been placed during this period. The same condition was true at Encino Reservoir where 182,700 cubic yards of material were placed in the structure. The surveys for the Weid Canyon Reservoir site have been completed and the work on the stripping of the dam site is well under way. The road from Cahuenga Pass into the camp and gravel and concrete bins has been completed. Detailed surveys of the new St. Francis Reservoir site have been completed. This reservoir site is located approximately one mile north of the lower San Francisquito Power Plant and will provide a storage of 30,000 acre feet.

Numerous trunk lines have been constructed, the most important of which is the York Boulevard Trunk Line from the new Riverside Drive Pumping Plant to Highland Reservoir. This line is 24 inches in diameter and will take care of the permanent supply into the Highland Park and Garvanza Section as well as providing the necessary supply to take care of the recently annexed City of Eagle Rock.

Several new installations have been made in the various pumping plants in order to keep pace with the increased demand in the sections they supply.

Emphasis is laid upon the water supply situation for the City as a whole, and the Chief Engineer has been carrying on investigations with the idea of providing a water supply far in excess of that in the City at the present time. These facts, as called attention to, will be revealed to the general public when sufficient data has been amassed in order to lay the matter before the city in a concrete form.

Attention is called to the stress imposed upon this Department due to the enormous growth of the City, both in population and industry. This fact brings forth the necessity of many important betterments that are at the present time under consideration and are outlined in the Budget for which it will be necessary to provide funds, by a further bond issue or by other means to enable this work to be performed.

The period covered by this report is the first full year of the operation by the Department of the electric distribution system acquired by purchase from the Southern California Edison Company. From a careful scrutiny of the operations of the Bureau of Power and Light, as set forth in the reports of the Chief Electrical Engineer and his assistants, it will be seen that the City of Los Angeles has not only realized a very substantial surplus as a municipal corporation from such operations, but also that the people as rate payers have realized an enormous saving in the amount paid for electric service by reason of the existence of the municipal electric system.

In such reports there are also fully set forth the facts concerning the great increase in the demand for electric energy for all purposes resulting from the amazing residential, commercial and industrial growth of the city.

The problem of meeting this demand, which is rapidly becoming a serious problem, by providing the necessary additions and betterments to the distribution system and also by providing additional generating plants as sources of power supply is ably dealt with by the Chief Electrical Engineer.

The reports of his Assistants make an interesting detailed showing of the work accomplished by the several Divisions of the Bureau of Power and Light during the year.

Again, the Board wishes to express its appreciation of the faithful co-operation, and efficient service of employees and heads of departments under its control.

Respectfully submitted,

BOARD OF PUBLIC SERVICE COMMISSIONERS
OF THE CITY OF LOS ANGELES.

By R. F. DEL VALLE, President.



SAN FRANCISQUITO CANYON, SHOWING PROPOSED DAM SITE AND PORTION OF RESERVOIR.
("A" SHOWS APPROXIMATE LOCATION OF DAM.)

Bureau of Water Works and Supply

Report of the Chief Engineer

The Honorable Board of Public Service Commissioners.
Gentlemen:

Herewith is presented, annual reports of the different branches of the construction and operating departments of the Water Works Department of the Service.

The reports in themselves are so complete that it would be superfluous to recite their contents in this place. It is deemed sufficient therefore to comment on and make deductions from the facts that they present.

It is at once apparent that the extraordinary growth of this City for the past few years, has not alone been maintained but has actually accelerated in the past year and to such an extent that the work of barely keeping up with it, in supplying the demand for water in the City that it has become exceedingly burdensome and almost impossible to accomplish results at all commensurate with the necessities.

Discerning the financial strain to which the Department was put to keep abreast of the immediate demands of the system, the people of the City heartily supported the \$5,000,000.00 Bond Issue asked for at the election of November 7th, 1922. It will still be noticed, however, that the City boundaries are being extended by persistent clamor for annexation for subdivision purposes and land speculation. These subdivisions have been made at such a rate as to provide vast areas for residential purposes in advance of actual needs, so that the City's occupied area has become a very diffused patchwork of widely detached extensions. This makes the task of keeping the Works up to date an extremely expensive one.

Last year there was presented in the report, a brief review of the water supply situation. At that time attention was called to a study of a period covering fourteen or fifteen years of the Owens River discharge and attention was called to the fact that the City might outgrow its capacity to supply sufficient water. As if to confirm that, the season just following has been one of the lowest in precipitation in the history of the term of years covered by our measurements, and re-emphasizes the importance of looking well in advance into the future for our prospective needs. Reconnaissance work to that end has been taken up or rather resumed, for in point of fact no engineering corps having the important task of the City's water supply in mind would be justified in relaxing vigilance on that point. Following this suggestion, this Department will have something in the way of disclosures to make that without doubt will create considerable discussion when revealed or released to the general public, contemplating as they will the possession of a vastly greater water supply than is now available.

The Los Angeles River supply, which has been showing consistent increase for several years due to the use of Aqueduct water in the San Fernando Valley, has been arrested in the progress of this new accession, by two influences in the past year, first of which is the small precipitation being only 9.59 inches which is well below the normal and the other due to the rapidly increasing extraction of water in the neck of the San Fernando Valley for the use of the unusual growth of the urban population in the towns of Burbank and Glendale, whose sole supply is drawn from the San Fernando Valley water. The aggregate of these two

communities must be close to 50,000 in population already, and these areas merge into the margin of the city to such an extent as to form a definite and inseparable part of the City of Los Angeles.

It will be necessary in the near future, notwithstanding the very material aid to our funds as reinforced by the Bond Issue of November 7, 1922, for \$5,000,000.00, to have a further bond issue of about the same amount or provide funds by other means to meet the requirement of large contemplated purchases of land and water rights in the Owens Valley, to bring our supply up to the Aqueduct's capacity of 400 cubic feet per second, as the complete run-off during the past fiscal year was 391 cubic feet per second. What this amount will be cannot be forecast at this time but involves the purchase of at least 25,000 acres of land with all water rights pertaining thereto. This calls for an additional review of our financial condition which should have your immediate attention.

The program of construction, at present under way, which includes the enlargement of the reservoir system has been actively pressed all year and is rapidly progressing toward completion, two of the reservoirs being nearly finished, namely Stone Canyon and the Encino Reservoir, and both of these without doubt will be in commission during the next fiscal year. Preparations are also being made to begin work on the Weid Canyon Reservoir which by the advancing growth in Hollywood is proving more and more a pressing necessity. On the whole, the condition of the Works, despite the many handicaps of pressing demands, is in fairly good condition as the appended reports will show. The most serious deficiency being that developing in the Harbor Region by rapidly increasing demands which are such as to outstrip the capacity of the present water source in that district. It is proposed, therefore, that a main be run down the shoestring strip to provide Aqueduct water for that region.

Appended hereto is a list of important items in our construction program, which contains the usual annual outline, plus the more important features needing immediate attention.

Respectfully submitted,

WM. MULHOLLAND, Chief Engineer.

BUREAU OF WATER WORKS AND SUPPLY
ENGINEERING DEPARTMENT

1923-1924 CONTEMPLATED IMPROVEMENTS AND
OPERATING EXPENSES

Item

1.	Cast Iron Pipe—Miscel. sizes; 6,000 tons at \$75.00 laid....	\$450,000.00
2.	Gates and Fittings	50,000.00
3.	Fire Hydrants, 600 at \$100.00 installed.....	60,000.00
4.	Automobile Depreciation	50,000.00
5.	Tools and Shop Equipment.....	25,000.00
6.	Meters—Domestic and Irrigation.....	175,000.00
7.	Encino Dam—Completion 121,000 cubic yards.....	75,000.00
8.	Encino Dam—Paving	3,000.00
9.	Santa Fe Ave. Industrial Trunk Line—24-in. Cast Iron	94,000.00
10.	Pico St. Main to Central Ave.—1 mile 24-in. Cast Iron	70,000.00
11.	Chatsworth Reservoir Improvement.....	50,000.00
12.	Mesa Drive Trunk Line—Adams to 54th Street 15,000 ft., 16 in., C. I.....	85,000.00
13.	Stone Canyon Dam—Completion 233,000 cubic yards.....	120,000.00
14.	Weid Canyon Trunk Line—36-in. Riveted Steel via Holly Drive, Primrose and Vine Street to Hollywood Boule- vard, 7,400 feet.....	80,000.00
15.	Van Nuys Warehouse Headquarters.....	15,000.00
16.	Lands and Pumping Equipment.....	100,000.00
17.	Harbor District Additional Supply.....	900,000.00
18.	Stone Canyon Trunk Line—46,500 feet.....	410,000.00
19.	Pressure Break Reservoir.....	45,000.00
20.	San Francisquito Reservoir and Dam Construction.....	100,000.00
21.	Construction Department—New Yard and Shops, Partial	250,000.00
22.	Weid Canyon Dam.....	400,000.00
23.	Weid Canyon Supply 36-in. Trunk Line.....	200,000.00
24.	Contingency Fund	200,000.00
	Total.....	\$4,007,000.00

Report of the Assistant Superintendent

July 1st, 1923.

Mr. William Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

I beg to present herewith a review of the work accomplished by the Construction Department for the fiscal year 1922-23, together with an outline of important betterments proposed to improve the distributing system.

During the entire year just closed the demands made upon this Department have been the greatest in the history of the Water Works. An extensive campaign of betterments was undertaken last winter but was not completed, due to the demands made upon us by the abnormal active building program throughout the City, which was also intensified by the great number of new subdivisions requiring extensions. There has been a marked increase in the cost of cast iron pipe, gate valves and other materials used in water works construction together with increased labor costs, as well as a noticeable deficiency of good labor.

LATERAL SYSTEM BETTERMENT

During the year the Department has installed 184.147 miles of water mains, four inches in diameter and larger in the City proper and Harbor Districts, exclusive of the irrigation district in the San Fernando Valley. The above mileage is an increase of 79.609 miles or 76 per cent over the year 1921-22.

The cast iron pipe laid during the year amounted to 17,071.095 tons, compared with 9,389.404 tons for the year 1921-22 or an increase of 7,681.691 tons, equivalent to 81.8 per cent increase over the previous year, which was the greatest tonnage of cast iron pipe previously laid in the history of the department. This tonnage represents an equivalent of 174.695 miles of cast iron pipe.

The total mileage of pipe laid of 4 inches in diameter and over was 184.147 miles, of which 76 per cent was laid for extensions and 24 per cent was laid for betterments.

In the engineering budget this year we ask for 8000 tons of cast iron pipe to be used for the replacement of mains in bad condition and the enlargement of mains in certain districts where they are of insufficient size to give satisfactory service.

SYSTEMS ACQUIRED

Privately owned systems acquired during the past year are as follows:

SYSTEM	DISTRICT	MILES OF PIPE
Dickinson & Gillispie.....	Atwater	3.391
Rigoli & Veselich.....	Atwater	1.288
Middleton	Hyde Park	2.114
Hollywood Scenic Tract.....	West Hollywood	1.876
Cottage Terrace Co.....	Glassel	0.752
Angeles Mesa Land Co.....	Angeles Mesa	13.501

TOTAL.....22.922 Miles

ccc

All the above systems, with the exception of Angeles Mesa, were laid under our specifications and are cast iron pipe. The Angeles Mesa system, with the exception of 6,700 feet, is cast iron. The new 12-inch trunk line supply for this District on 54th Street from the Western Avenue Trunk Line is completed and serving this District.

The annexation of the City of Eagle Rock has added approximately forty-one miles of mains to our system, of which 21 miles are 4 and 6-inch cast iron and the balance 2-inch standard screw pipe, which is inadequate to supply the portion of the district served, consequently a large portion of these lines will have to be enlarged. The district at the present time is supplied by an 8-inch connection from the York Boulevard Trunk Line, while the permanent supply will come from the Garvanza Pumping Plant with a 16-inch Trunk Line on Annandale Avenue, from the Highland Reservoir, elevation 613 feet, to the Kuhli Street Reservoir, elevation 900 feet. This line has been contracted for and will be installed during the early fall. In order to provide for an adequate service in this fast-growing hill section, it is recommended that the present 6-inch line on Sycamore Avenue from the Kuhli Street Reservoir be replaced by a 16-inch line, which will provide for the complete development of this District.

TRUNK LINES CONSTRUCTED

The Trunk Line construction program for the year totaled 16.627 miles, laid in different sections of the City, following the usual policy of installing lines into the areas where the growth and development are intensified. The most important of these lines are as follows:

The 30 and 24-inch York Boulevard Trunk Line from the new Riverside Drive Pumping Plant to the Highland Reservoir being a supplemented supply to the Garvanza and Highland Park District.

The 24-inch cross tie trunk line on Manchester Avenue from the Western Avenue Aqueduct supply line east on Figueroa Street. This is a very important line traversing the extreme south limits of the City, tying in all fag ends in this fast-growing section which also supplies the territory southerly by the new 12-inch main on Hoover Street as far south as 99th Street, which heretofore was poorly served.

In the west central portion of the City the new 12-inch lines on Adams Street, La Brea Avenue and West Boulevard have enabled us to give better service to the complete new development in this district.

The new 12-inch main from the Sanborn Avenue Booster Plant on Sanborn Avenue from Fountain Avenue to Sunset Boulevard double ends the supply into this district which was poorly served, as well as relieving the district farther east in the same zone of supply. The Sanborn Plant is also provided with an overflow relief by way of a new 14-inch line connection into the 24-inch trunk line supplying the Finley Avenue tank which was overloaded, due to the great number of new homes in the East Hollywood District which it supplies.

The east end of the Hollywood District supply has been greatly benefited by the new 10-inch line on Vine Street from Melrose Avenue to Santa Monica Boulevard.

NEW TRUNK LINES

The new Pico Street Trunk Line connecting with the Westgate Trunk Line from the Stone Canyon Reservoir is by far the most important supply line into the City since the construction of the Cahuenga Trunk line from the Franklin Reservoir. Contracts have been awarded for this new 36-inch supply line which will be the second Aqueduct line into the City proper. This new line will supplement the present supply into the south and western portion of the city and will be completed during the coming winter. In connection with this line it is recommended that a 24-inch line connecting with the Pico Street line at West Boulevard

and Washington Street be laid on Washington Street, east to the Western Avenue line and a new 12-inch line on Adams Street from West Boulevard westerly.

Due to the growth of the City south of Adams Street and west of Western Avenue it is recommended that a 16-inch line be laid on Angeles Mesa Drive from Adams Street south to the 12-inch line on 54th Street.

It is recommended that the Manchester Avenue line be extended to Main Street with 24-inch diameter pipe and east from Main Street to South Park with 16-inch pipe, thereby completing the tie across the south end of the City, and also a 12-inch connection on Main Street from Manchester Avenue north to Slauson Avenue.

The present 12-inch line on Rowena Avenue from Hyperion Avenue to the Edendale Pumping Plant at Silver Lake should be enlarged to 16-inch in order to give an increased supply into the zone supplied from the Edendale Tank, which water will be entirely derived from the new Riverside Drive Pumping Plant upon the completion of this line.

We have had in our budget for several years, three important trunk lines, the construction of which I again recommend; they are known as the second leg of the Santa Fe Avenue Industrial Trunk Line, the Pico Street line from Main Street to Central Avenue and the Hooper Avenue line from 16th Street to Vernon Avenue, all to be 24-inch in diameter.

REGULATING TANK

The new 450,000-gallon steel storage tank in the hill section of the Bairdstown District was put into service this summer; this tank has a high water elevation of 705 feet above sea level and is so designed that it is completely filled during the hours of low consumption and emptying during the peak load periods.

HARBOR DISTRICT

The growth in the Harbor District has kept pace with the balance of the City and 13.884 miles of mains, 4 inches in diameter and larger, have been laid, of which 56 per cent were extensions and 44 per cent enlargements and betterments, in addition to which it was necessary to lay approximately $3\frac{1}{2}$ miles of 2-inch pipe for extensions which are only considered as temporary lines.

Service to Terminal Island through the 12-inch supply line across the East Channel was interrupted three times by the line pulling apart during the spring months. Due to the enormous industrial development on Terminal Island it is recommended that an additional supply line be constructed preferably by a tunnel which would insure an adequate supply at all times.

CONSTRUCTION DEPARTMENT HEADQUARTERS

During the past year the Department has acquired land at Ducommun and Alameda Streets on which pipe yards, warehouses, garage and machine shops are to be constructed to house all equipment and material for the construction and operation of the water works. Plans for these structures are well under way and I hope construction work on same will soon be started, as this Department is hampered and has completely outgrown its present quarters.

Due to the vast territory covered and the enormous growth of the city south and west, it is earnestly recommended that an additional pipe and supply yard be equipped on our property at Slauson and Compton Avenues where we have railroad facilities to handle pipe and heavy equipment.

It is recommended that a portable crane, gas driven and mounted on tractors, be purchased for use in this yard.

Table showing operation of Transportation Department is attached hereto.

Respectfully submitted,

THOS. BROOKS, Asst. Superintendent.

OPERATION OF THE TRANSPORTATION DIVISION

The automobile fleet as of June 30, 1923, comprises 317 vehicles, various types, and 10 trailers; during the last fiscal year 141 new cars or trucks were added to the fleet. During the same period 37 old cars were junked, sold, or traded in.

Touring cars, not Fords.....	30	
Roadsters, not Fords.....	12	
Ford—5-passenger touring type.....	17	
Ford—2-passenger roadster type.....	70	TOTAL 129

FOR TRANSPORTATION OF MATERIAL, FOREMAN AND CREWS

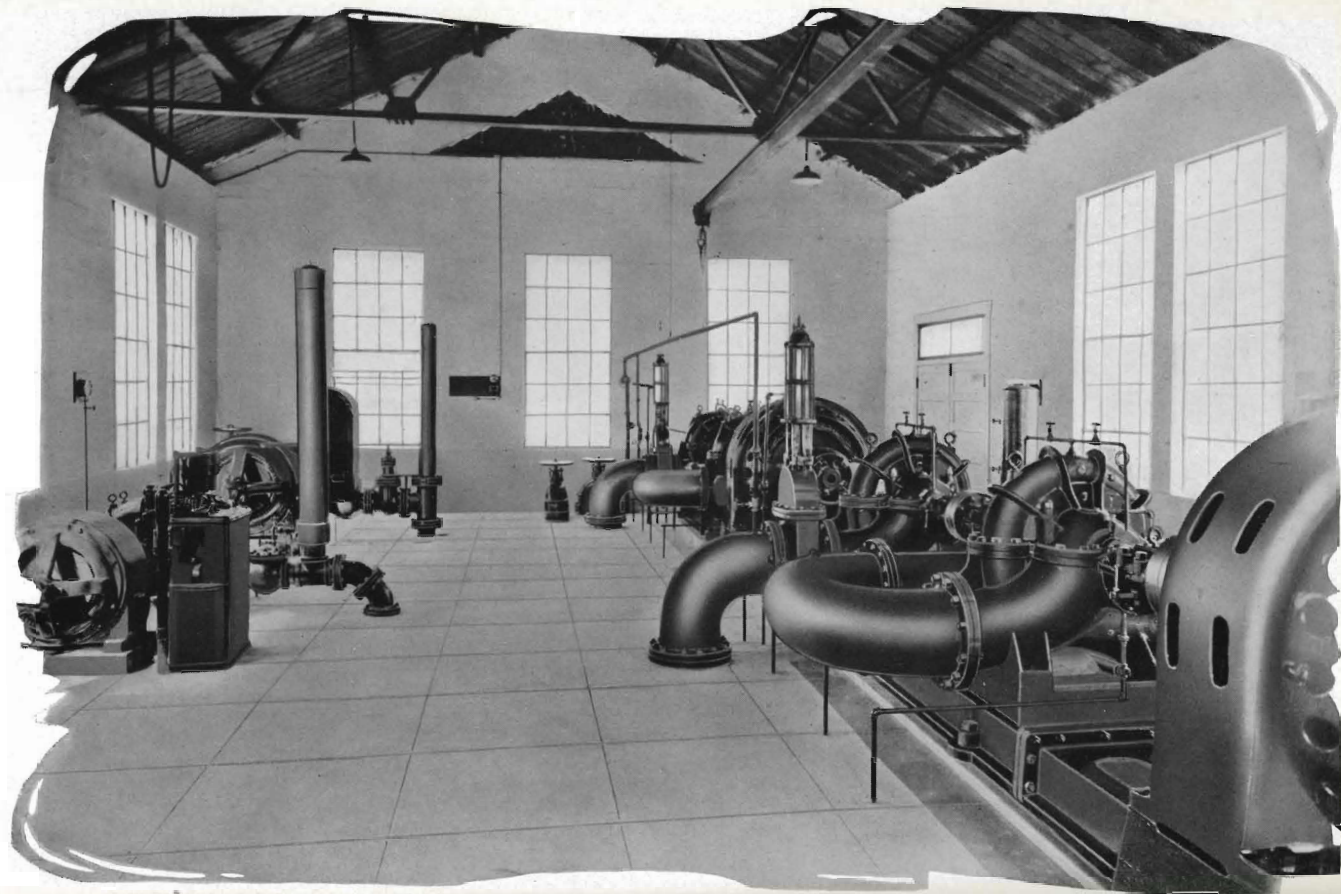
Touring cars and runabouts equipped with work bodies	2	
Ford cars and runabouts equipped with work bodies.....	72	
Light trucks—all makes and uses.....	39	
Heavy trucks—for men and material.....	68	
Pumping and compressing machinery, mounted on motor trucks.....	7	TOTAL 188

TOTAL 317

Trailers—four-wheel, four-ton.....	4	
Trailers—four-wheel, fourteen-ton.....	1 (Hauling trenching machines)	
Trailers—two-wheel, one-ton.....	5	TOTAL 10

THE ABOVE CARS ARE DISTRIBUTED ON THE WORKS AS FOLLOWS

	Touring	Runabouts	Work Cars	Trucks	Total
Los Angeles City and Harbor Districts.....	33	69	33	87	222
San Fernando Valley.....	2	9	31	21	63
Los Angeles Aqueduct.....	12	4	10	6	32



INTERIOR - RIVERSIDE PUMPING PLANT. - JUNE 1923



EXTERIOR - RIVERSIDE PUMPING PLANT. - JUNE 1923

Report of the Chief Mechanical Engineer

July 1, 1923.

William Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

Complying with your request, I am submitting in the following paragraphs a review of the operations and construction work accomplished together with proposed improvements of the Mechanical Pumping Plants and Reservoirs Department for the fiscal year just closed.

The year's statistical tables show an enormous increase in pumpage. The total amount of water pumped from the thirteen plants in operation during the year was 18,111,622,580 gallons, or an increase of 7,125,480,970 gallons, equivalent to 65 per cent over the previous year. All pumping plants show a big increase with the exception of the Slauson Avenue Plant, where there was a decrease of approximately 160,000,000 gallons compared with the year 1921-1922. The Slauson Avenue and Figueroa Plants in the past years, considered as emergency summer plants, were operated during the past year 270 and 317 days, respectively, as compared with 249 days the previous year, which was the longest period of operation since the plants were installed. This plainly demonstrates the necessity of an additional supply in the southern part of the city to be used as a kickback or balance on the system, otherwise large additional expensive trunk lines would have to be installed to get the desired results.

Fuel oil consumed by the seven plants using oil amounted to 57,195 barrels as compared with 57,345 barrels the preceding year. The cost of fuel oil at the beginning of the fiscal year was \$1.25 per barrel, but was rapidly reduced to 90 cents per barrel, and for the past six months the price has varied from 85 to 70 cents per barrel.

Due to an accident to the Cooper engine at the Buena Vista Plant it was necessary to remove one of the new motor driven Pelton units at the Riverside Drive Plant to Buena Vista, where it has been installed permanently as a stand-by, this being the first motor driven unit to be installed in this plant.

The unit consists of a 500 H.P. Electrical Machinery Company synchronous motor direct connected to a 4,500-gallon-per-minute Pelton 14-inch centrifugal pump mounted in tandem and connected in series.

NEW EQUIPMENT

A new 4-stage De Laval centrifugal pump with a capacity of 600 gallons per minute direct connected to a 100 H.P. General Electric motor has been installed at the Mount Washington Plant, and at the Las Palmas Plant a 4-stage Byron Jackson centrifugal unit having a capacity of 1000 gallons per minute direct connected to 125 H.P. General Electric motor has been installed. This equipment doubles the capacity of the above plants.

At the new Riverside Drive Plant the new Pelton unit is installed and the Byron Jackson unit contracted for. These new units each have a capacity of 4500 gallons per minute, pumping through the New York Avenue Trunk Line to Highland reservoir. Both units are connected in series and mounted in tandem and are direct connected to two 500 H.P. Electric Machinery Company's synchronous motors.

In this plant the new Edendale unit is also installed, which consists of a multi-stage Byron Jackson centrifugal pump having a capacity of 1500 gallons per minute, direct connected to and driven by a 200 H.P. General Electric motor.

In order to supply the Eagle Rock District recently annexed to the City, two new motor driven pumping units have been contracted for, which will be located at the Garvanza Pumping Station at Highland Reservoir. The operation of these new pumps, in addition to supplying Eagle Rock, will be able to supply the higher area of the Highland Park and Garvanza districts, now served by the Mount Washington system, which is already overloaded.

It is also recommended that an additional unit be provided for the San Pedro Hill service in the Harbor District as the consumption at the present time is equal to the capacity of the plant. It will be necessary to supplement the present supply in the Harbor District, and it is recommended that additional wells be drilled in this region.

The new Sanborn Avenue Booster Plant located at Fountain Avenue near Sanborn Junction, recently put into operation, greatly increases the service into the extreme west end of the zone supplied with water from the Highland and Salano Reservoirs.

Venturi meters equipped with Simplex Gauge Recorders have been installed in the Crystal Springs and MAIN SUPPLY conduits and at the new Riverside Drive pumping plant, and also will be installed this year on the Franklin Canyon and Stone Canyon Trunk Lines and at the Wilmington and Eagle Rock Pumping Plants.

STONE CANYON DAM

Work was resumed in July, 1922, on the Stone Canyon Dam, 253,900 cubic yards of material having been placed during the year, of which 55,000 cubic yards is hydraulic fill. Sluicing was started during February. The dam was raised an average of 35 feet and the present average elevation is 780 feet above sea level. The dam is approximately 70 per cent complete and there remains but 232,800 cubic yards to finish the structure.

NEW WELLS

Five new wells have been drilled at Crystal Springs, all 16 inches in diameter and cased. These wells have not yet been tested out or connected up to the Crystal Springs conduit.

Respectfully submitted,

FRED J. FISCHER,

Chief Mechanical Engineer.

DATA ON THE PUMPING SYSTEM OF THE LOS ANGELES CITY WATER DEPARTMENT FOR THE FISCAL YEAR ENDING JUNE 30, 1923.

STATION	NUMBER AND MAKE	Maximum Total Lift	Average Lift	Rated Capacity Gallons Per Day	Total Gallons Pumped July 1, 1922 to June 30, 1923	Oil Fuel Gallons	Period Operated
BUENA VISTA..	1 Risdon I Pump.....	240'	203'	7,000,000	.....	.....	.....
	1 Risdon II Pump.....	300' to Reservoir	300'	7,000,000	4,676,074,800	1,254,493	Entire Year Applied with steam is not possible to separately.
	1 Snow Pump.....	300' to Reservoir	300'	7,000,000	.....	.....
	1 Kerr Steam Turbine Pump..	300' to Reservoir	300'	7,000,000	.....	.....
	1 Kerr Steam Turbine Pump..	300' to Reservoir	300'	7,000,000	.....	.....
	1 14" Pelton Centrifugal pump unit mounted in t a n d e m direct driven by 500 H. P. Synchrous Motor.....	300' to Reservoir	300'	6,300,000	.....	.....
.....	
SLAUSON AVENUE.....	1 Risdon I Pump.....	200'	150'	4,000,000	402,911,690	231,253	7-1-22 to 12-13-22
	1 Worthington.....	200'	150'	2,500,000	.....	.....	.....
	1 Laidlaw-Dunn Gordon Com- pressor.....	80' from Wells	80'	.....	.....	.....	3-19-23 to 6-30-23
FIGUEROA.....	1 Monarch Pump.....	210'	150'	4,000,000	902,206,120	369,811	7-1-22 to 2-3-23
	1 Laidlaw-Dunn-Gordon Com- pressor.....	65' from wells	65'	.....	.....	.....	.....
	1 Worthington Pump.....	210'	150'	4,000,000	.....	.....	4-24-23 to 6-30-23
GARVANZA.....	1 Prescott Pump.....	135'	135'	2,000,000	498,746,000	2,445	Entire Year
	1 Single Stage Double Suction Centrifugal Motor Driven 100 H. P.....	135' All to Reservoir	135'	2,500,000	.....	.....	.....
EDENDALE.....	1 Prescott Pump.....	320' to Reservoir	320' to Reservoir	1,500,000	434,726,600	26,756	Entire Year
	1 Two-stage Pelton Centrifugal pump, direct driven by 150 H. P. Motor.....	.....	.....	1,330,000	.....	.....	.....
HEADWORKS...	1 Laidlaw-Dunn-Gordon Com- pressor.....	Not Known	About 25' from well	12,000,000	4,655,564,430	466,107	Intermittent throughout the yr.
WILMINGTON..	1 Allis-Chalmers.....	200' to Reservoir	200'	4,000,000	2,368,900,000	285,060	Entire Year
	1 Laidlaw-Dunn-Gordon Com- pressor.....	.....	Estimated 60'	4,000,000	.....	.....	.....
	1 Pelton Double Suction Vo- lute Centrifugal. Direct Driven by 250 H. P. Motor...	200' to Reservoir	.....	5,000,000	.....	.....	.....
	1 Allis-Chalmers 12 In. Cen- trifugal Direct Driven by 100 H. P. Motor.....	200' to Reservoir	200'	6,500,000	.....	.....	.....
	4 Wells equipped with 4 Motor Driven Turbine Pumps.....	.....	80' from wells	4,000,000	.....	.....	.....
LAS PALMAS...	1 4-stage Byron-Jackson Tur- bine.....	.....	220'	720,000	192,168,000	.....	Entire Year
	1 4-stage Byron-Jackson Cen- trifugal Direct Driven by 75 H. P. Motor.....	.....	220'	720,000	.....	.....	.....
MOUNT WASHINGTON	1 4-stage Allis Chalmers Cen- trifugal Direct Driven by 100 H. P. Motor.....	350' to Reservoir	350'	864,000	95,299,200	.....	Entire Year
MEAD.....	1 4-stage Byron Jackson Cen- trifugal Pump Direct Driven by 30 H. P. Motor.....	350' to Reservoir	350'	720,000	52,694,900	.....	Entire Year
SEVENTH ST...	1 Single Stage Byron Jackson Centrifugal Direct Driven by 125 H. P. Motor.....	250'	250'	4,500,000	934,309,250	.....	Entire Year
POLLOCK.....	1 Byron Jackson Horizontal Centrifugal, Belt Driven by 100 H. P. Motor.....	35'	35'	5,000,000	609,912,850	.....	Intermittent
CRYSTAL SPRINGS.....	1 Laidlaw Compressor 18"x20" Duplex, Single Stage Driven by 250 H. P. Motor.....	Not Known	About 25' from wells	12,000,000	2,288,108,736	.....	Intermittent throughout the year.
	1 Ingersoll Rand Compressor 16"x16" Duplex, Si n g l e Stage Driven by 200 H. P. Motor.....	.....	.....	.....	.....	.....	.....
TOTALS.....	.....	.....	.....	.....	18,111,622,580	2,404,672 = 57,195 barrels.	.....

Report of the Superintendent of Irrigation

July 1, 1923.

Mr. William Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

Herewith is submitted a report on the operation of the San Fernando Valley Irrigation System for the fiscal year ending June 30, 1923.

There has been quite a large acreage in the valley subdivided into town lots. Most of these subdivisions are distributed along the Ventura Boulevard from Cahuenga Pass to Topanga Canyon Road. Due largely to the result of the subdivision of this acreage, 24,408 miles of extensions have been laid as compared with 11,154 miles for last year. While a considerable acreage of farming land has been subdivided into small holdings and used for poultry raising, etc., and less surface crops have been planted between the trees in young deciduous and citrus orchards, there has been an increase in acreage devoted to alfalfa and other surface crops.

ENCINO RESERVOIR

Construction work has continued throughout the year on the Encino Dam, resulting in the placing of 182,700 cubic yards of dry fill, which brings the total yardage to 380,640. The present crest elevation is 984 feet above sea level, and there remains 121,000 cubic yards of fill to complete the dam to elevation 1022. Our schedule calls for the completion of this dam by March 1, 1924, and barring any unforeseen interruption, there should be approximately 3000 acre feet of storage in the reservoir at the beginning of the irrigation season. In addition to the much needed additional storage, this reservoir will greatly improve the service along the south rim of the valley and especially the foothill area, as it will act as a kickback and balance on the system.

HANSEN HEIGHTS

The contract for the pipe in the Municipal Improvement District, known as Hansen Heights, was awarded during June and calls for delivery beginning in October. This system will be completely installed during the coming winter, which will give the much needed relief to this section by next spring.

CONSUMPTION OF IRRIGATION WATER

Irrigation during the year in total quantity of water consumed is the greatest for any one year since the Aqueduct water was turned into the San Fernando Valley system. The use of water during July, August and September, 1922, was slightly less than the same period of 1921, while the consumption during the spring months of 1923 was greatly in excess of the spring of 1922. This excess is accounted for by the deficiency of rainfall throughout the whole year, while the spring months were devoid of any rainfall.

While at the beginning of the irrigation season, April 15, 1923, the San Fernando Reservoir was full and at the end of the fiscal year, June 30, 1923, the water elevation was 15 feet lower than on the same date last year, the difference being 4500 acre feet less storage in the lower San Fernando Reservoir this year as compared with the previous year.

IRRIGATION SERVICES

The number of irrigation services in the system total 3388. New services added during the year amounted to 217.

The following table shows the number and size of services as well as the segregation by districts:

	Size and Number				Total
	2-In.	3-In.	4-In.	6-In.	No.
Number of Services July 1, 1922.....	270	913	1,798	201	3,182
Installed during fiscal year 1922-23.....	34	82	84	17	217
	<u>304</u>	<u>995</u>	<u>1,882</u>	<u>218</u>	<u>3,399</u>
Less Services Cancelled.....	1	3	7	0	11
	<u>303</u>	<u>992</u>	<u>1,875</u>	<u>218</u>	<u>3,388</u>
Districts—					
Van Nuys.....	123	480	572	53	1,228
Owensmouth	12	142	636	125	915
San Fernando.....	168	370	667	40	1,245

Tables showing the monthly and annual mean average consumption of irrigation water by 24 hour cubic feet per second flow for the past four years.

Month—	1922-23	1921-22	1920-21	1919-20
July	225.56	243.90	370.86	326.22
August	257.14	277.51	212.86	245.24
September	162.85	150.40	130.10	110.02
October	97.24	76.68	83.62	49.02
November	21.62	67.23	18.84	43.04
December	3.75	28.51	11.64	7.36
January	9.51	3.84	8.44	19.56
February	2.38	0.00	2.84	27.00
March	51.50	0.84	15.14	12.88
April	89.81	36.27	232.10	61.60
May	227.30	142.09	80.04	144.96
June	200.75	222.23	82.16	215.70
Mean.....	<u>112.45</u>	<u>104.125</u>	<u>104.053</u>	<u>105.217</u>

Plans have been made and approved by our Engineering Department for the erection of new warehouse, garage, shops and pipe yards in Van Nuys. The construction of this headquarters for the construction and operation of the San Fernando Valley system is now under way.

Respectfully submitted,

RODERICK MACKAY,

Superintendent of Irrigation.

Report of the Superintendent of the Meter and Service Department

Mr. Wm. Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

I beg to submit herewith a record of the activities of the Meter and Service Department for the fiscal year ending June 30, 1923, covering Los Angeles, San Pedro and the San Fernando Valley.

DOMESTIC METERS—LOS ANGELES, SAN PEDRO AND SAN FERNANDO VALLEY

5/8	Inch.....		81,942
5/8 x 3/4	“.....		56,778
3/4	“.....		2,248
3/4 x 1	“.....		6,813
1	“.....		4,688
1 1/2	“.....		2,672
2	“.....		1,630
3	“.....		243
4	“.....		165
6	“.....		18
8	“.....		1
Total number of meters in service June 30, 1923.....			157,198
Number of meters in service July 1, 1922.....			137,019
Number of meters set during the year.....			20,179
Meters in service, Domestic and Combination.....			157,198
Meters in service, Intermittent Irrigation.....			3,321
Jet meters in service, sewer flushing.....			3,036
Grand Total.....			163,555

METERS SET—JULY 1, 1922, TO JUNE 30, 1923

Exclusive of Straight Irrigation Meters in San Fernando Valley			
Los Angeles.....			17,502
San Pedro.....			1,517
San Fernando Valley.....			1,160
Total.....			20,179

METER OPERATION

During the past twelve months the Department has removed 12,280 meters. These meters were removed for failure to operate due to all causes, taken out where the use of the service was discontinued for the time being, where services were enlarged, and minor repairing. There were 34,514 meters tested during the year before setting.

SERVICES—LOS ANGELES, SAN PEDRO AND SAN FERNANDO VALLEY

Straight Irrigation Services in the San Fernando Valley Are Not Included

Number of services June 30, 1923.....	172,224
Number of services July 1, 1922.....	151,223
Total increase of services July 1, 1922, to June 30, 1923.....	21,001
Total number of metered services June 30, 1923, meters in.....	157,198
Total number of metered services June 30, 1923, meters out.....	2,947
Total number of flat rate services June 30, 1923.....	3,384
Total number of flush tank services, Jet metered, 6-30-23.....	3,036
Total number of flush tank services, not metered, 6-30-23.....	2,146
Total number of disconnected services June 30, 1923.....	2,308

Total number of services sold not yet installed June 30, 1923.....	686
Free water services, supplying parks, Dept. Bldgs., etc., 6-30-23....	287
Old service numbers listed for resale.....	232
	<u>172,224</u>
Irrigation services, San Fernando Valley.....	3,374

Grand Total..... 175,598

(Note) Included in above flat rates are (714) Fire Services, ranging in size from 1-inch to 8-inch.

Service Work for the Year Ending June 30, 1923, for Los Angeles, San Pedro and San Fernando Valley

Month	Year	New Dom. Services	Sewer Services	Temp. Services	Enlarging Services	Total
July,	1922	1,280	15	21	76	1,392
Aug.,	1922	1,402	14	34	75	1,525
Sept.,	1922	1,432	22	36	67	1,557
Oct.,	1922	1,733	20	21	80	1,854
Nov.,	1922	1,413	24	16	88	1,541
Dec.,	1922	1,308	20	14	117	1,459
Jan.,	1923	1,370	20	27	66	1,483
Feb.,	1923	1,441	19	6	99	1,565
Mar.,	1923	1,818	25	44	118	2,005
Apr.,	1923	1,882	27	58	163	2,130
May,	1923	2,127	70	74	156	2,427
June,	1923	1,692	29	63	172	1,956
Total.....		18,898	305	414	1,277	20,894

(Note) The Meter and Service Department took over the renewal of service connections in advance of street paving in November, 1922, and from that date to June 30, 1923, there were (3159) renewals made.

Services For All Uses, June 30, 1923

Los Angeles	San Pedro	San Fernando Valley	Total
158,738	7,570	9,290	175,598

Service Increase for All Uses—July 1, 1922, to June 30, 1923 Including Straight Irrigation Services in San Fernando Valley

Los Angeles	San Pedro	San Fernando Valley	Total
18,022	1,574	1,593	21,189

Service Connections Taken Over From Private Water Companies During the Last Fiscal Year

Name of Company	Date Taken Over	½ In.	¾ In.	1 In.	1 ½ In.	2 In.	4 In.	Total
Angeles Mesa District	2-14-23	1,342	1	5	5	1	1	1,355
Eagle Rock System.....	6-18-23	2,543	253	63	5	8	0	2,872
Mutual Water Co.....	6-28-23	14	30	5	0	0	0	49

4,276

Operation of Services and Meters—Los Angeles, San Pedro and San Fernando Valley—July, 1922, to June 30, 1923

Meters changed.....	11,888	Meter leaks.....	9,785
Water turned on.....	18,722	Inspections.....	15,828
Water shut off.....	8,773	Meter glasses.....	5,081
Meters read to date.....	1,078	Bills collected.....	34
Regular readings.....	1,885	Miscellaneous.....	8,293
Total jobs covered by field meter inspectors and repairs for the year.....			81,367

Respectfully submitted,

GEO. READ,

Meter and Service Supt.

Report of Biologist

July 1, 1923.

Mr. William Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

The year ending June 30, 1923, has been an active one for this Division. Twice as many bacteriological samples have been handled as during last year, while the area over which these samples have been collected has been extended, owing to the expansion of the city.

The quality of the water delivered to consumers, as shown by laboratory examinations, has been excellent most of the time, and water-borne disease has been unknown in any section of our city. With the exception of a period in May and June when difficulties were encountered at Silver Lake, complaints of bad water have been fewer in number than for several years. Increased consumption in May made it necessary to cut Silver Lake Reservoir into service immediately after the destruction of a major pulse of green algae through the use of a maximum dose of copper sulphate. The topography of this lake bottom and its surrounding drainage basin is such that following the spring overturn the impounded water is undisturbed except to a depth of perhaps five feet by wind and wave action. Very naturally this condition permits early exhaustion of the oxygen in the water lying beneath a plane ten or fifteen feet below the surface. Such stagnant water always develops foul odors and even becomes discolored, but of course typhoid or other pathogenic bacteria cannot develop *de novo*, in such a situation any more than elsewhere. Furthermore, disease-producing bacteria which might find their way into the lake would meet with such antagonism from the saprophytic bacteria which develop in stagnant water in great numbers that they would quickly die.

Bacteriological examination of this water showed the entire absence of colon bacillus (the index of dangerous pollution) in 50 c.c. samples, and the necessity of using the water was so urgent that it was turned into the distribution system. Many complaints followed this action, and an effort was made to remove the odor by chemical means. Laboratory experiment proved that ammonium persulphate in a dosage of 2 P.P.M. would accomplish this end, but the Department's stock of the chemical was low (this salt is an innovation in water purification, just introduced by this Department, which explains why so small a supply was kept on hand), and quickly gave out. Recourse was then had to the use of potassium permanganate at the rate of about four pounds per million gallons. The results attained were fair, but not equal to the persulphate. The final solution of the difficulty was in altering the intake so as to use water from the surface of the lake, which was uniformly good physically as well as bacteriologically. Silver Lake has been in active service continuously since the change was made with entire satisfaction.

The Department purchased at the latter end of the fiscal year four new chlorine dosing machines of the latest type, and these are being installed in such positions that complete sterilization of the entire water supply can be effected whenever required, with reserve machines for emergency use.

The mineral content of the water is practically unaltered, and the typical analyses as published in the Annual Report last year accurately represent the average of the various waters at present.

During the year a well constructed fence has been built around Chatsworth Reservoir and this has been a great aid in protecting the water against pollution. A number of arrests have been made during the year for fishing and trespass at this lake, and this action has resulted in making it easier to maintain Chatsworth Reservoir free from pollution. A determined effort was made to repeal the ordinance prohibiting fishing, hunting, bathing, boating, etc., on city reservoirs, but the City Council wisely refused to take action. The cost of enforcing the law is relatively slight, and the benefits secured are too great to be abandoned.

The improvements which the writer recommends for greater protection to the water supply are:

Better control of storm water at the upper end of San Fernando Reservoir No. 1.

A fence and diversion ditch around Silver Lake.

A circulating system at Silver Lake to prevent stagnation of the bottom water.

Respectfully submitted,
CARL WILSON, Biologist and Laboratory Director.



SECTION OF EASTERLY HALF OF STRIPPED SITE - HOLLYWOOD DAM, JUNE 1923
(DAM ITSELF WILL OCCUPY THE SPACE SHOWN BETWEEN THE WHITE LINES)

Report of the Office Engineer

July 1, 1923.

Mr. William Mulholland, Chief Engineer,
Bureau of Water Works and Supply,
Los Angeles, California.

Dear Sir:

Following is presented a review of the work of the Engineering Department for the fiscal year 1922-1923.

During the year there have been thirteen annexations to the City having a combined area of 24.74 square miles, which brings the total area of the City to 370.17 square miles. The greatest portion of the area added this year is the Laurel Canyon District, consisting of 13.57 square miles, most of which is a rugged mountainous country in the Santa Monica Mountains, lying between the San Fernando Valley and Westgate and extending from Stone Canyon to Cahuenga Pass. The other annexations are Angeles Mesa and Hyde Park, comprising 2.53 square miles in the southwest portion of the City; Eagle Rock, having an area of 3.17 square miles in the northeast part of the City, and the Ambassador, Hancock, Sawtelle and other small additions in the west portion of the City, totaling 8.64 square miles in area.

MUNICIPAL IMPROVEMENT DISTRICTS

Surveys, designs and estimates for the construction of water work systems have been completed and bonds voted to carry out the improvement in the Angeles Mesa and Sawtelle Districts, while the surveys for the district known as Laurel Canyon have been practically completed, but owing to the fact that the design and estimate of this system is interlocked with the proposed Mulholland Skyline Drive, it has been impossible to complete the estimate as the only location for the Supply Trunk Line to serve this district will be located on this highway.

Complete plans and estimate of cost have also been prepared for the proposed annexation and Municipal Improvement District, designated as Lankershim, but as yet the people of this locality have taken no action in the matter. Contracts have been awarded for the pipe for the Sawtelle District calling for delivery to commence in December, so the coming spring will see this system completed.

NEW RESERVOIRS

Detail topographic surveys and plans for the San Francisquito Reservoir have been completed together with preliminary designs for a gravity-type masonry dam.

The dam site of this reservoir is located in San Francisquito Canyon, one mile north of Power Plant No. 2. The major portion of this reservoir site is owned by the City on property that is known as the Saint Francis Ranch and Le Brun Ranch, totaling approximately 480 acres, all other land in the site belongs to the United States Government, the City having filed on same up to the 1825 contour.

The floor of the canyon at the dam site is at elevation 1660 feet above sea level and at elevation 1800 provides a storage of 21,000 acre feet and at this elevation the water surface will cover 400 acres, while at elevation 1825, with a dam 165 feet high, the capacity is approximately 30,000 acre feet.

This reservoir is by far the most important storage basin at this end of the Aqueduct, it will derive its supply from the surplus water of the Aqueduct used for power during the winter months, which water during the past years has been wasted into the Santa Clara and Los Angeles Rivers.

The reservoir will also derive a supplemental supply from the high mountainous country which it will drain by the natural runoff from a drainage area of $37\frac{1}{2}$ square miles, on which the mean annual rainfall is approximately 20 inches.

The construction road into the Weid Canyon Dam Site was completed this spring and work on stripping the dam site preparatory to pouring concrete is practically finished.

Contracts for the Insley Tower concrete placing plants were let in May, calling for the delivery of this equipment during the month of July.

The revised design and plans for this dam calls for approximately 170,000 cubic yards of concrete in the structure, which will provide a storage capacity of 7900 acre feet in the reservoir.

The surveys and plans have been completed for the Sawtelle pressure break reservoir, which is located approximately one mile north of Wilshire Boulevard just west of the Westgate Trunk Line on Stone Canyon Road. The high water elevation of the reservoir is 421 feet above sea level, having a capacity of 118 acre feet, and the dam will contain 27,000 cubic yards of material.

The purpose of this reservoir is to break the high pressure from the Westgate Trunk Line, as a supply for the new Sawtelle-Pico Street Trunk Line to serve the Sawtelle District and the western portion of the City.

OFFICE RECORDS

Purchases of cast iron pipe during the past year aggregated 22,855.8 tons as compared with 13,405.5 tons for the preceding year, which was the previous high record for pipe purchased. The equivalent mileage of this tonnage is 214.61 miles, the price range varied from \$47.90 per ton in August, 1922, to \$66.74 per ton in June of 1923, all f.o.b. cars Los Angeles, thus there has been a steady increase in the cost of pipe throughout the year.

As an indication of the growth of the City, the following facts taken from the records might be of interest. New subdivision tracts to the number of 538 have been officially received and plotted on our maps, as compared with 273 the previous year. Extension orders to the number of 1350 received and checked as against 900 for last year and 1810 Foreman's reports of pipe installed for extensions and betterments compared with 1222 for the year 1921-22, also 21,001 service reports or an increase of 5401 over last year.

SUPPLY AND CONSUMPTION

The total rainfall for the year ending June 30th, 1923, was 9.59 inches, amounting to a deficiency of 6.05 inches from the normal of 16.54 inches as compared with 19.66 inches for the year 1921-22.

In addition to the below normal rainfall approximating 39 per cent deficiency in this vicinity, the very light snowfall on the Sierra Nevada Mountains throughout the winter resulted in a very light runoff for the Owens River Supply, and the Haiwee Reservoir on July 1st stood at elevation 3737, as compared with elevation 3758 July 1st, 1922. This is the lowest elevation for the water surface in Haiwee Reservoir on July 1st since 1916.

The mean flow of the Owens River supply available for Haiwee Reservoir for the year was 391 cubic feet per second.

The supply available from the Los Angeles River for the year amounted to a mean flow of 75.10 cubic feet per second as compared with 80.82 cubic feet per second for the year 1921-22 or a decrease of 7 per cent.

An inspection of the monthly mean daily domestic consumption tables below shows a comparison of the daily use of water for the past three years.

Month	Gal. Per Day 1920-21	Gal. Per Day 1921-22	Gal. Per Day 1922-23
July	90,769,000	97,063,000	101,898,000
August	83,226,000	93,448,000	109,874,000
September	78,586,000	94,019,000	109,228,000
October	80,744,000	64,981,000	86,632,000
November	64,806,000	74,612,000	76,847,000
December	63,333,000	69,034,000	71,567,000
January	68,180,000	74,154,000	74,727,000
February	69,376,000	60,539,000	81,565,000
March	79,626,000	72,981,000	84,725,000
April	81,501,000	88,674,000	78,152,000
May	73,551,000	82,195,000	102,428,000
June	85,372,000	105,616,000	108,949,000
Daily mean flow for year	76,589,000	81,416,000	90,549,000
Daily mean flow, six summer months, (April to Sept. inc.).....	82,167,000	93,448,000	101,756,000
Daily mean flow, six winter months, (Oct. to Mar. inc.).....	71,011,000	69,383,000	79,342,000

The following tables contain a complete record of all pipe, gate valves and fire hydrants in the distributing system segregated by districts and in total.

Respectfully submitted,

W. W. HURLBUT,

Office Engineer.

Distribution System

STATEMENT OF PIPE LAID, ACQUIRED, RECOVERED AND ABANDONED OF FOUR INCHES DIAMETER OR LARGER DURING THE YEAR ENDING JUNE 30, 1923.

LOS ANGELES CITY.

131.827 miles of extension of mains 4" and over in diameter laid.
 126.293 miles of which are cast iron, amounting to 10,677.0274 tons.
 5.534 miles of which are standard screw casing or riveted steel.
 8.689 miles of mains 2" in diameter were laid.
 38.202 miles of mains 4" and over in diameter were laid for betterments.
 34.748 miles of which are cast iron amounting to 5287.1633 tons.
 3.454 miles of which are standard screw or riveted steel.
 Total mileage laid during year 4" and over in diameter, 170.029 miles.
 16.701 miles of this is trunk lines 10" and over.
 8.106 miles is trunk lines 16" to 30" in diameter.

Size	Feet in System June 30, 1922	Feet Laid the Year	Feet Acquired During the Year	Feet Recovered During the Year	Feet Abandoned During the Year	Feet in System June 30, 1923
4"	2,981,807	468,411	149,192	38,662	29,646	3,531,102
5"	8,360	-----	-----	445	-----	7,915
6"	1,420,321	287,430	61,447	17,470	4,749	1,746,979
7"	10,218	83	40	-----	611	9,730
8"	317,626	54,887	5,300	323	1,255	376,235
10"	174,792	6,697	-----	96	294	181,099
12"	427,838	35,027	2,730	7,011	-----	458,584
14"	15,168	3,655	-----	-----	-----	18,823
16"	67,883	2,201	-----	-----	-----	70,084
18"	47,803	-----	-----	-----	-----	47,803
20"	64,212	2,246	-----	-----	-----	66,458
22"	9,245	-----	-----	-----	-----	9,245
24"	129,074	28,347	-----	-----	-----	157,421
27"	10,908	-----	-----	-----	-----	10,908
30"	115,665	9,617	-----	-----	-----	125,282
36"	62,398	-----	-----	-----	-----	62,398
40"	38,750	-----	-----	-----	-----	38,750
42"	10,317	-----	-----	-----	-----	10,317
44"	4,872	-----	-----	-----	-----	4,872
48"	2,030	390	-----	362	-----	2,058
52"	11,716	-----	-----	-----	-----	11,716
68"	4,318	-----	-----	-----	-----	4,318
	<u>5,935,321</u>	<u>898,991</u>	<u>218,709</u>	<u>64,369</u>	<u>36,555</u>	<u>6,952,097</u>

Feet in system June 30, 1922, has been increased 126,045 feet by combining the Westgate District with Los Angeles City.

Total miles in system June 30, 1923.....	1316.685
Total miles in system June 30, 1922.....	1124.114

Net gain, miles..... 192.571

Number of miles in system June 30, 1922, has been increased 23.872 miles by combining Westgate District with Los Angeles City District.

HARBOR DISTRICT

7.804 miles of extensions of mains over 4" in diameter, all cast iron, amounting to 553,1785 tons.

3.485 miles of 2" standard screw laid for extensions.
 6.080 miles of mains 4" and over in diameter laid for betterments.
 5.850 miles of this is cast iron, amounting to 553.7258 tons.
 0.230 miles of this is standard screw pipe.

Size	Feet in System June 30, 1922	Feet Laid During the Year	Feet Acquired During the Year	Feet Re-covered During the Year	Feet Abandoned During the Year	Feet in System June 30, 1923
4"	94,956	28,455	.....	192	.....	123,219
5"	13,714	.....	.....	60	977	12,677
6"	143,450	38,116	.....	75	.....	181,491
8"	16,230	2,026	.....	.....	.....	18,256
10"	31,601	3,720	.....	1,855	.....	33,466
12"	14,711	.....	.....	.....	.....	14,711
14"	805	.....	.....	.....	.....	805
16"	330	.....	.....	.....	.....	330
20"	25,743	.....	.....	.....	.....	25,743
12" Conc.	.....	244	.....	.....	.....	244
14" Conc.	706	750	.....	.....	.....	1,456
	342,246	73,311	.....	2,182	977	412,398
Total miles in system June 30, 1923.....						78.106
Total miles in system June 30, 1922.....						64.819
Net gain, miles.....						13.287

SAN FERNANDO DISTRICT

24.408 miles extensions made of pipe 4" in diameter or over.
 3.653 miles of which is cast iron pipe, amounting to 205.010 tons.
 14.140 miles of which is Matheson pipe.
 6.615 miles of which is riveted steel pipe.
 0.825 miles of 4" standard, 6" and 8" Matheson laid for betterments.

Size	Feet in System June 30, 1922	Feet Laid During the Year	Feet Acquired During the Year	Feet Re-covered During the Year	Feet Abandoned During the Year	Feet in System June 30, 1923
4"	100,632	19,674	.....	.....	5,098	115,208
6"	538,133	103,722	.....	177	801	640,877
8"	748,805	1,640	.....	.....	2,892	747,553
8" Conc.	583	.....	.....	.....	.....	583
10"	25,661	.....	.....	.....	157	25,504
12"	381,701	6,859	.....	.....	.....	388,560
12" Conc.	3,154	.....	.....	.....	.....	3,154
14"	242,354	1,336	.....	.....	.....	243,690
16"	88,256	.....	.....	.....	.....	88,256
18"	34,753	.....	.....	.....	.....	34,753
18" Conc.	1,042	.....	.....	.....	.....	1,042
20"	16,418	.....	.....	.....	.....	16,418
20" Conc.	2,431	.....	.....	.....	.....	2,431
22"	12,433	.....	.....	.....	.....	12,433
24"	44,819	.....	.....	.....	.....	44,819
24" Conc.	669	.....	.....	.....	.....	669
27"	5,854	.....	.....	.....	.....	5,854
30"	54,043	.....	.....	.....	.....	54,043
33"	12,022	.....	.....	.....	.....	12,022
36"	12,292	.....	.....	.....	.....	12,292
39"	18,562	.....	.....	.....	.....	18,562
40"	8	.....	.....	.....	.....	8
42"	7,744	.....	.....	.....	.....	7,744
45"	7,912	.....	.....	.....	.....	7,912
48"	5,265	.....	.....	.....	.....	5,265

50"	7,888	.....	.....	.....	7,888
52"	20,095	.....	.....	.....	20,095
54"	8,237	.....	.....	.....	8,237
60" Conc.	4,936	.....	.....	.....	4,936
62"	4,607	.....	.....	.....	4,607
64"	9,800	.....	.....	.....	9,800
66"	15,900	.....	.....	.....	15,900
68"	1,505	.....	.....	.....	1,505
72"	31,537	.....	.....	.....	31,537
	2,470,051	133,231	177	8,948	2,594,157
Total miles in system June 30, 1923.....					491.318	
Total miles in system June 30, 1922.....					467.813	
Net gain, miles.....					23.505	

SUMMARY OF MILEAGE
OF FOUR INCHES DIAMETER OR LARGER

	In System June 30, 1922	Laid During the Year	Acquired During the Year	In System June 30, 1923
Los Angeles City District.....	1124.114	170.263	41.422	1316.685
Harbor District.....	64.819	13.884	.....	78.106
San Fernando District.....	467.813	25.233	.....	491.318
	1656.746	209.380	41.422	1886.109

NET GAIN—MILES

Los Angeles City District.....	192.571
Harbor District.....	13.287
San Fernando District.....	23.505
Total gain.....	229.363

GATES
LOS ANGELES CITY

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
4"	5,564	964	.....	6,528
5"	50	.....	.....	50
6"	3,976	743	.....	4,719
7"	7	.....	.....	7
8"	538	65	.....	603
10"	206	10	.....	216
12"	406	41	.....	447
14"	14	.....	.....	14
16"	48	.....	1	47
18"	25	1	.....	26
20"	61	13	.....	74
22"	8	.....	.....	8
24"	70	3	.....	73
26"	5	.....	1	4
30"	17	.....	.....	17
36"	9	.....	.....	9
	11,004	1,840	2	12,842
Net gain in gates—1,838				

Number of gates in Los Angeles City, June 30, 1922, has been increased by 36 gates, due to consolidation of Westgate District.

GATES
HARBOR DISTRICT

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
4"	170	33	.....	203
5"	11	.....	1	10
6"	418	51	.....	469
8"	36	.....	.....	36
10"	28	1	.....	29
12"	14	.....	.....	14
14"	1	.....	.....	1
16"	22	.....	.....	22
22"	1	.....	.....	1
	701	85	1	785

Net gain in gates—84

GATES
SAN FERNANDO DISTRICT

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
4"	1,455	228	.....	1,683
6"	732	65	.....	797
8"	170	.....	.....	170
10"	5	.....	.....	5
12"	88	.....	.....	88
14"	8	.....	.....	8
16"	6	.....	.....	6
18"	8	.....	.....	8
20"	3	.....	.....	3
22"	5	.....	.....	5
24"	3	.....	.....	3
26"	1	.....	.....	1
30"	4	.....	.....	4
36"	6	.....	.....	6
48"	3	.....	.....	3
54"	1	.....	.....	1
	2,498	293	000	2,791

Net gain in gates—293

GATE SUMMARY

District	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
Los Angeles City.....	11,004	1,840	2	12,842
Harbor District.....	701	85	1	785
San Fernando District.....	2,498	293	0	2,791
	14,203	2,218	3	16,418

Total gain—2,215

FIRE HYDRANTS
LOS ANGELES CITY

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
2½" Single.....	5,656	325	.....	5,981
2½" Double.....	155	.....	6	149
4 " Double.....	493	43	.....	536
	6,304	368	6	6,666

Net gain in fire hydrants—362

FIRE HYDRANTS
HARBOR DISTRICT

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
2½" Single.....	247	27	.....	274
2½" Double.....	27	.....	.....	27
	274	27	0	301

Net gain in fire hydrants—27

FIRE HYDRANTS
SAN FERNANDO DISTRICT

Size	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
2½" Single.....	53	29	.....	82
2½" Double.....	4	.....	3	1
	57	29	3	83

Net gain in fire hydrants—26

FIRE HYDRANT SUMMARY

District	In System June 30, 1922	Added During the Year	Removed During the Year	In System June 30, 1923
Los Angeles City.....	6,304	368	6	6,666
Harbor District.....	274	27	0	301
San Fernando District.....	57	29	3	83
Total	6,635	424	9	7,050

Total gain in fire hydrants—415



OWENS RIVER GORGE

Bureau of Power and Light

Report of the Chief Electrical Engineer

Los Angeles, Cal., July 1, 1923.

To the Honorable Board of Public Service Commissioners,
City of Los Angeles.

Gentlemen:

Important features of the activities of the Bureau of Power and Light for the fiscal year ending June 30, 1923, are given in some detail in the reports of the four branch heads of the Bureau, which are included herewith and preceded by brief general remarks regarding the same and the necessity for providing for the future expansion of the City's municipal electric system both as to power development and distribution stations and lines.

FINANCIAL OPERATIONS OF THE BUREAU

Financial status and operating conditions of the Bureau of Power and Light are fully set out in the Audit Report of Price, Waterhouse & Company covering, in addition to the fiscal year in question, the previous fiscal year and a summary of the assets and liabilities of the Bureau from its inception and beginning of operations in 1909 to June 30, 1923.

This report shows the total assets of the Bureau to be \$35,340,448.88, with corresponding liabilities of but \$25,064,535.82. This shows that the City has a net equity in its electric system over and above all liabilities of \$10,275,913.06. This net equity is made up of three items, as follows: Unamortized premium on bonds, \$299,865.41; moneys derived from taxes used for the benefit of power, \$3,552,843.89; and surplus earnings or profits resulting from the Bureau's operations of \$6,423,203.76.

Should the item representing the total tax money ever used for the benefit of power be regarded as a liability of the Bureau, the assets still exceed the liabilities by \$6,723,069.17.

The Audit Report further shows that during the fiscal year 1922-23 the total earnings of the Bureau or income was \$7,762,606.97 and that after deducting full allowances for operation and maintenance, depreciation and interest on all outstanding power bonds, there was a surplus or profit of \$2,693,623.34.

It appears, therefore, that the surplus earnings amount to more than one-third of the total or gross earning and that the actual cost to the City for the service rendered, including fixed charges, was \$5,068,983.63. It is worthy of note that at the rates charged during that period by the private power company in Long Beach and other parts of Southern California, to-wit: the Southern California Edison Company, the service rendered by the Bureau of Power and Light would have cost the consumers approximately \$10,400,000.00, or more than twice the actual total cost to the City for rendering the service.

ADDITIONS AND BETTERMENTS TO SYSTEM

Additions to the generating and transmission system for the year consist of the San Fernando Power Plant, of 8000-horsepower capacity; a fourth unit at Power Plant No. 1, in the San Francisquito Canyon, thus increasing the capacity of the plant by one-third, and the partial completion of a regulating reservoir at Plant No. 2 and of the installation of the 25,000-kilowatt synchronous condenser and additional switching facilities at the Central Receiving Station.

Two large distributing stations of modern design and suitable for unit extension from time to time are nearing completion in the harbor district and the southern end of the business center, and large increases in capacity of all distributing stations, of distributing feeders and transformer stations have been made to meet the rapidly increasing demand for electric service in all parts of the city.

SAFETY COMMITTEE ESTABLISHED

During the early part of the year there was organized a General Safety Committee, composed of the heads of the several divisions of the Bureau of Power and Light. Under this Committee there have been created Employees' Safety Committees which are charged with the duties of watching for hazardous conditions arising in connection with the work in which they are engaged and facilitating in the spreading of safety rules and first aid to employees. Active co-operation of the Safety Engineer with the State Industrial Accident Commission and National Safety Council has been effected. Although this safety organization has been at work less than six months, an apparent decrease of approximately 16 per cent in the number of accidents, as compared with the preceding six months, is indicated, showing the value of such an organization where large numbers of men are employed.

DEMAND FOR ELECTRIC SERVICE

Demand for electric service in the City of Los Angeles for domestic, commercial, industrial and municipal purposes has been increasing at the rate of 20 per cent per annum, compounded, for the last six years, and at a rate of but little less than this for the last ten years. This rate of annual increase means practically doubling the demand for electric service every four years and is an increase far greater than the rate of increase of population as may be observed.

Service rendered by the Bureau during the last year, as measured by the kilowatt hours distributed, was 368,778,861, or 23.7 per cent greater than for the previous fiscal year and the peak demand at the central distributing point was approximately 110,000 horsepower for the service of the Power Bureau alone, or 28 per cent greater than for the previous year and the increase in the number of services or consumers' meters was 23,737, or an increase of approximately 17 per cent over the previous year, making a total of 162,767 at end of year.

FUTURE POWER DEMAND AND SUPPLY

It appears that for the year 1928 there will be required for domestic, commercial, industrial and municipal purposes in this city at least 250,000 horsepower of plant capacity in addition to the municipal hydro-electric plants and the existing steam plant of the Los Angeles Gas and Electric Corporation.

It also appears from the records of the Railroad Commission that the plans of the Southern California Edison Company for power development for the next five years are altogether inadequate and insufficient to meet the demands of the territory covered by that Company and at the same time to fulfill its contractual obligations with the City of Los Angeles as to power supply. Furthermore, the service rendered by the Company under its contract with the City has been unduly intermittent and unsatisfactory, causing great loss and inconvenience to the City and electrical consumers in the city. The City's power supply, from its own municipal plants, has proved to be more reliable than the portion of its supply secured from the Company. The Bureau's station records indicate that something like six out of every seven interferences with electric service to our consumers, resulting from interruption in or defective power supply, have been due to deficient service from the Company.

The City has established municipal water and electric systems and has enjoyed great benefits therefrom in low rates for domestic, commercial, industrial and municipal water and electric service and the prosperity resulting from an unusually rapid growth in population and industry. It must not be forgotten, in this connection, that in establishing these municipal utilities and enjoying the benefits thereof, that the City has assumed the burden and responsibility of providing adequate water and power supplies, as well as adequate provision for their distribution.

It is manifest that the City must take immediate steps to provide for large additional hydro-electric power plants, as well as for provision for the expansion of the electrical distributing system, in order to pave the way for the continued prosperity and welfare of our citizens by providing adequate service commensurate with the demands which are doubling, in fact at the present time more than doubling, every four years.

It was never intended that the City should depend on its contract with the Edison Company for its future power supply in the place of building additional plants from time to time. That contract was regarded merely in the light of an economic measure in providing for an interchange of power. Experience shows, as stated above, that the City's necessities and responsibilities are such that it cannot depend on such contract and that unless steps are taken for providing additional power plants we will be face to face with a serious shortage of power within a very few years.

THE COST OF POWER SUPPLY

The cost to the City for the electric power generated at the municipal plants and delivered at the central point of distribution in the City during the last fiscal year was 0.34 cents per kilowatt hour; this cost including operation and maintenance, together with full allowance for depreciation and for interest on power bonds.

The cost of the power purchased from the Southern California Edison Company during the year was 0.93 cents per kilowatt hour, or more than two and one-half times the cost to the City of generating its own power. It is to be expected that a rate may be secured from the Company in future considerable less than 0.93 cents, but there appears no justification for assuming that the rate will ever be less than double the average cost to the City of developing its own power from hydro-electric sources.

COLORADO RIVER AS SOURCE OF POWER

The cheapest and the only adequate source from which the City can secure its needed additional power is the Colorado River. The City, together with other municipalities and communities of Southern California, and, in fact, also of Southern Nevada and Arizona in considerable extent, is and has been constantly supporting the proposed legislation before Congress intended to carry out the recommendations by the Reclamation Service and Secretary Fall for the development of a large storage project by the government at Boulder Canyon on the Colorado River. This project has for its purpose protection of the Imperial Valley and other districts from destructive floods, conservation of flood waters that irrigated areas may be doubled, and the creation of the opportunity for the development of a large block of hydro-electric power at the dam site. The City seeks not only to aid in this great benefit to the whole Southwest, but to secure for itself its fair share of opportunity for the development of power at the dam site.

Estimates show that the first installment of 250,000 horsepower may be developed at the dam site, transmitted and delivered at a central station in Los Angeles for \$25,000,000 and that the cost per kilowatt hour

would be less than 0.45 cents from the beginning of operation of the plant and that as the total power opportunities at the Boulder Canyon dam site are more fully developed, the cost per kilowatt hour of that portion which may be delivered for and in Los Angeles would not exceed 0.33 cents per kilowatt hour.

Respectfully submitted,

E. F. SCATTERGOOD,

Chief Electrical Engineer.

Operating Division

T. A. PANTER, *Electrical Engineer in Charge*

During the past year four power plants, consisting of San Francisco No. 1 and No. 2, Franklin Canyon and River Power Plant, have been in regular successful operation throughout the year. In addition, San Fernando Power Plant began operation on October 22, 1922, and has been in continuous service since that time. These five plants have generated a total of 260,650,170 kilowatt hours.

The River Power Plant has been operating as in previous years, that is, as a generating station during the winter months and as a synchronous condenser during the irrigation season. The peak load generated by these hydro-electric plants during the year was 64,300 kilowatts, while the peak demand during the year was 80,427 kilowatts.

The accompanying tabulation marked "Appendix A" shows the total number of kilowatt hours generated at the switchboards of the respective plants of the City, and the quantity of electric energy supplied to the City through the operating of the Pasadena Municipal Steam Plant. The amount of electric energy purchased from the Southern California Edison Company is also shown together with the kilowatt hours distributed over the municipal system during the year.

There have been no increases in the number of distributing substations or appreciable additions to the 110,000-volt lines, but during the past year a large amount of work has been done in co-ordinating the system acquired from the Southern California Edison Company with that built by the City, so that at the present time the Bureau of Power and Light operates 175 miles of 33,000-volt lines and 84 miles of 15,000-volt lines, which indicate an increase of 15 miles of 33,000-volt lines and a decrease of 64 miles of 15,000-volt lines and 20 miles of 10,000-volt transmission lines, which have been salvaged. This decrease in length of lines greatly reduces the tendency for troubles and materially benefits service to the distributing stations, and, in turn, to the consumers.

The San Fernando Power Plant, as indicated above, began operation in October, 1922, and for the year generated 21,563,000 kilowatt hours. As these figures are for only a portion of the year, the next report will show a decided increase from this plant.

ENLARGEMENT OF TELEPHONE FACILITIES

During the year it has again been necessary to enlarge our exchange and another unit has been added to the board in the Public Service Building, making four panels in operation. In addition, an order has been placed for the fifth panel necessitated by the tremendous increase in business transacted by the Department of Public Service. This is shown by the fact that during the fiscal year of 1921-1922 the number of calls averaged 2573 per day; while during the present fiscal year 1922-1923 the average number of calls per day has reached the figure of 8126.



MT. ALICE IN THE SIERRA NEVADAS, ELEVATION 13016 FEET.
BIG PINE LAKE NO. 2 IN FOREGROUND.

GROWTH IN OTHER SECTIONS

It may be of interest to indicate in a brief way the greatly increased amount of work handled by the other sections during the present year over previous years. For example, in the Testing Section during the fiscal year 1921-1922 a total of 13,239 meters and 1166 transformers were tested; while during the fiscal year of 1922-1923 the total number of meters tested was 37,340, and transformers, 3,779.

A like growth is also indicated in the Transportation Section, as during the fiscal year 1921-1922 a total of 191 automotive vehicles, with a total mileage of 919,000 miles was shown as against 296 automotive vehicles and a mileage of 2,529,305 for the present fiscal year 1922-1923. This additional number of vehicles and greatly increased mileage necessarily increase the amount of maintenance and repair work in practically the same proportion.

The Electric Repair Shop reports that the number of individual jobs passing through that Section for the fiscal year 1921-1922, total 826; while for the present fiscal year 1922-1923, the number totals 2,327.

An analysis of the amount of business transacted by the General Warehouse shows an increase of 345 per cent for the fiscal year 1922-1923 over the fiscal year 1921-1922.

Operations at General Headquarters, 211 East Power Street, of the General Warehouse, General Machine Shop and Transportation Section, Testing Section and General Electric Repair Shop have been seriously handicapped due to the unavoidable delay in the construction of the proposed new General Warehouse, Machine Shop and Electric Repair Shop.

Construction Division

H. C. GARDETT, *Electrical Engineer in Charge*

Following is a brief account of the work done by the Construction Division during the fiscal year ending June 30, 1923:

SURVEYS, FILINGS, STUDIES:

Kings River Project:

Records have been kept of stream flow at the measuring station installed by the department and other water observations and studies made. Negotiations were begun and have been continued with the irrigators on Kings River looking toward an understanding regarding the storage and use of water for power development by the City and cooperation with the irrigators in the building of the Pine Flats Dam.

Mono Project

Maps were prepared and necessary filings were made from previous surveys and studies, with both the State Division of Water Rights and the Federal Power Commission for the storing and diversion of Leevining, Walker, Parker and Rush Creeks in the Mono Basin through a proposed tunnel into the proposed Long Valley Reservoir. Further studies to perfect and maintain these rights are still being made.

San Francisquito No. 1—Surveys

Surveys and studies were made of certain upper parts of San Francisquito Canyon and Elizabeth Lake Canyon to determine the possibility of storage in addition to Fairmont Reservoir immediately above San Francisquito Plant No. 1. Also surveys of a portion of San Fran-

cisquito Canyon below Power Plant No. 2 preparatory to a determination of rights and responsibilities when it may become necessary to discharge water into the San Francisquito Canyon and the Santa Clara River.

General Hydrographic Work

Hydrographic work on Owens Valley streams has been continued in cooperation with the Bureau of Water Works and Supply as well as those on Kings River and the South Fork of Kern River and the resulting records kept up to date.

OWENS VALLEY PROJECTS

In addition to construction work done on the Owens River Gorge Project some work was done on other Owens Valley projects with a view of continuing and perfecting the rights thereto and shortening the time required for construction. This work has been mostly construction or location of roads and trails.

Two miles of a proposed road to Rock Creek Lake was built in the fall of 1922 and it is expected that when funds are available for this purpose this road will be finished in co-operation with the National Forest Service and others.

On Big Pine Creek a trail was built from the dam at Lake No. 2 to Lake No. 5.

A survey was made on Cottonwood Creek to determine the feasibility of a road from the present intake to the proposed site of Power Plant No. 2. Some work was done including replacement of a bridge and lessening of the grade on the old road to the present intake.

OWENS RIVER GORGE PROJECT

The work of preparation for the lining of Tunnel No. 2 as previously reported was continued, the requisite cement hauled and stored at Crooked Creek, the concrete plant tested by the lining of Adit No. 1 and a first set-up of the tunnel. Included in the above preparations a 33,000-volt line was completed from Division Creek to Camp 5 on the Gorge, a distance of 51 miles, connecting with the 33,000-volt line to Crooked Creek as previously reported.

When work of lining Tunnel No. 1 was discontinued a single shift was started January 1, 1923, on the excavation of Tunnel No. 2, and 456 feet excavated.

FAIRMONT DAM

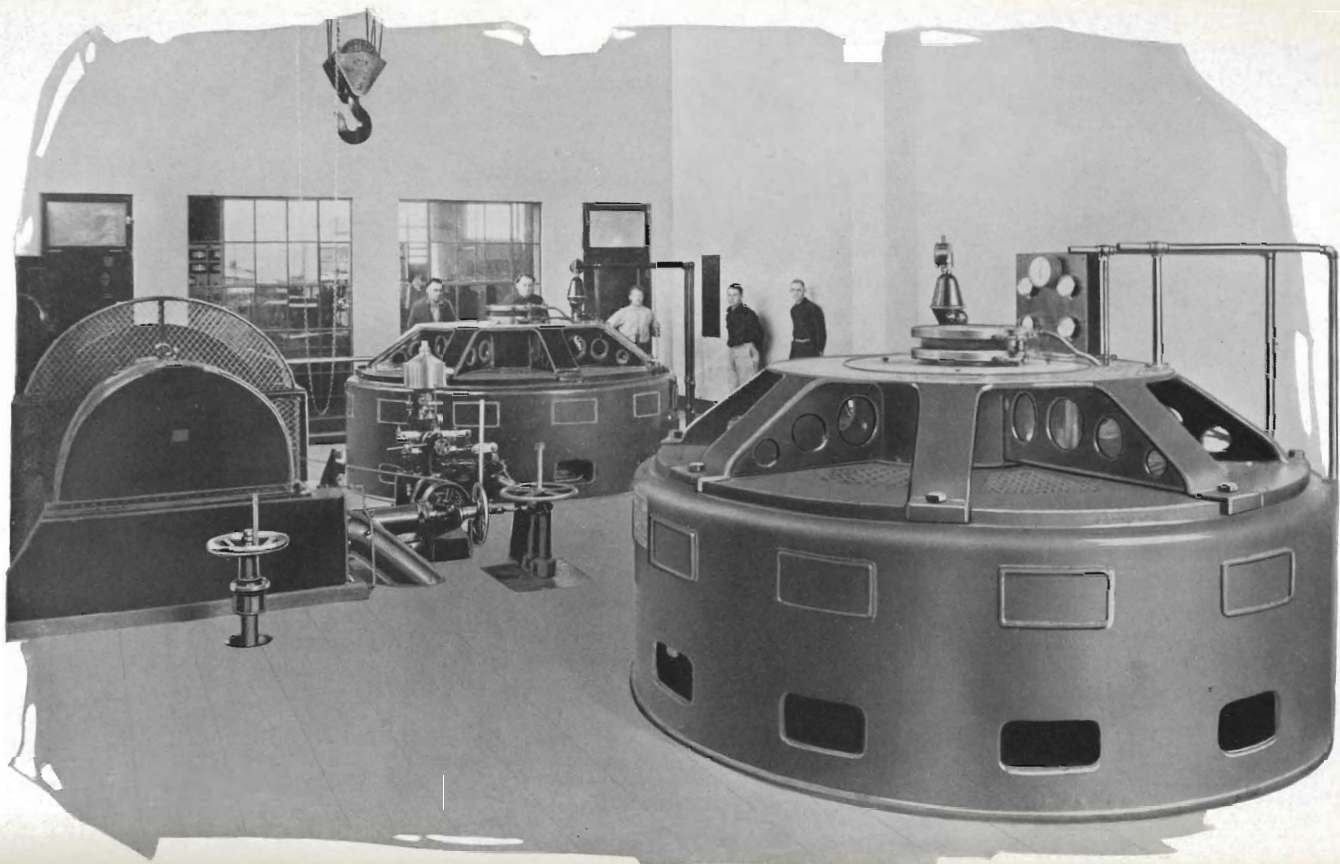
On September 15, 1922, work was started to raise the Fairmont Dam and Dike to the ultimate height to afford more regulatory storage above the San Francisquito Plants. This work was diligently prosecuted until it was temporarily discontinued on April 5, 1923, with a total progress of 50,700 cubic yards of fill.

SAN FRANCISQUITO POWER PLANT NO. 1

The machinery and equipment, including penstock pipe previously reported as purchased for the 4th unit of the above plant, was received and installed during this fiscal year, the unit being started in May, 1923, although the final efficiency tests were not made.

The ventilating end bells for the three old units of the above plant were received and were being installed on June 30, 1923.

Additions to the permanent camp at this plant were made, consisting of two 4-room cottages and one 7-room dormitory.



INTERIOR VIEW, SAN FERNANDO POWER PLANT, CAPACITY 8000 H. P.

SAN FRANCISQUITO POWER PLANT NO. 2

The excavation and fill for the regulating reservoir in Drinkwater Canyon, to be used in conjunction with the surge chamber of Plant No. 2, was completed in November, 1922, and the reservoir filled and tried without lining. It was determined necessary by this trial to adhere to the original plan of lining with concrete the bottom and most of the sides of this reservoir, including the upper face of the dam.

This lining was started in February, 1923, but not quite completed at the end of the fiscal year.

When the dam was completed a road was dug connecting the road from San Francisquito Canyon to the road along the transmission line in Haskell and Dry Canyons, thus affording more direct means of patrolling these lines and another way of access to the power plants during times of high water in San Francisquito Creek.

Additions to the permanent camp were made consisting of one club house including general dining room, one five-room cottage, and six four-room cottages as well as partial grading of grounds.

SAN FERNANDO POWER PLANT

The work previously reported on this plant was continued, including the 110,000 volt line connection to the San Fernando Switching Station, and the plant placed in operation during October, 1923. The installation of the lightning arresters, grading, completing of backfill, and general clean up was done after the plant was in operation, but all work was finished and the camp discontinued in January, 1923.

For the housing of the operating force at this plant five four-room cottages were constructed, three being located near the plant and two at the San Fernando switching station about a mile away.

CENTRAL RECEIVING SUBSTATION

The addition to the Central Receiving Substation No. 1 previously reported as necessary to house the synchronous condenser equipment purchased and provide additional switching facilities due to the increased demands, has been planned and work is well under way, and the condenser equipment has been received but not installed during this fiscal year.

GENERAL WAREHOUSE AND SHOPS

As previously reported in the needs of the Operating Division, additional land was purchased contiguous to the property at St. John and Power Streets and this Division was authorized to proceed with the building of additional warehouse and shops. The shop building has been designed and foundations laid. A two-story and basement warehouse 320 feet long by 75 feet wide has been designed and work started and well under way.

This enlargement of grounds to accommodate the growing activities of the Bureau in order to fully utilize the property, called for the vacation of St. John Street from Power Street to the Los Angeles River and also of the alley between Main and St. John Streets and North of Power Street. This vacation of street and alley has been accomplished.

MAINTENANCE

General maintenance of the hydraulic plants, waterways, central receiving substations, roads, etc., has been kept up with some changes and betterments.

Distribution Division

C. A. HEINZE, *Electrical Engineer in Charge*

This Division of the Bureau of Power and Light has just closed the most active year of its existence. This work has been occasioned by three conditions, namely: the acquisition and consolidation of the Los Angeles distributing system of the Southern California Edison Company with that previously constructed by the Bureau; the necessity for rehabilitating the system acquired from the Southern California Edison Company so as to properly take care of the existing business, and for extending it to provide for the future increasing business; and, lastly, the phenomenal growth of the City, which has reflected itself in our work by increased demands made upon our system of more than 30 per cent during the past year.

Last year's report outlined the program adopted in amalgamating the employees transferred to this Department from the Southern California Edison Company's organization with those of our own, and the dividing of the work falling upon the Distribution Division into various sub-departments. Some idea of the problem involved can be gained from the fact that the Distribution Division increased its personnel from 200 employees on May 16th to approximately 1400 on November 1st. During the year just closing we have had an opportunity to adjust this organization, making such changes and elimination as would increase its efficiency.

The necessity for delivery of power to distributing stations located in the underground district has resulted in one of the notable events of our year's work, worthy of more than passing notice was the design and purchase of 36,000 feet 35,000-volt 3-conductor lead-covered cable, the highest voltage cable of its kind in use today. This cable was built to our specifications and was based upon experience and confidence obtained during the two year's operation of similar cable which the Bureau installed in the San Pedro District, this San Pedro cable being the first successfully operated 35,000-volt 3-conductor cable in the United States.

Standards have been established, as the result of engineering investigations and studies, for the construction of overhead, underground and substation structures. This reduces warehouse stocks, expedites the construction and maintenance work by assuring that the work in all districts is of the same uniform character.

The construction of Substation No. 3 and No. 9 has been carried on and the entire first floor and basement of the building at 316 West Second Street, purchased by the Department for the use of the Commercial Division, have been remodeled. Also the offices in the building at 120 East Fourth Street were remodeled for the use of this Division.

A salvage warehouse was built for the Operating Division at Slauson and Long Beach Avenues for the purpose of caring for salvage material such as transformers, wire, etc., which we are recovering in large amounts, due to the consolidation and reconstruction of the Edison system and which are of no further use to the Bureau.

A district headquarters, a warehouse, a garage and a service yard were built at San Pedro for the use of construction and maintenance crews and the yards and offices at 255 East Third Street were reconstructed and thus made adequate for use as headquarters for our underground and trouble departments.

OVERHEAD SYSTEM

33,000-Volt Line Extensions

A definite plan for 33,000-volt distribution lines has been worked out for the San Fernando, Los Angeles and San Pedro Districts and the past year of construction work on 33,000-volt lines, aside from the taps made for industrial consumers, has been given over to reinsulating the 15,000-volt lines of the former Edison system, which will fit in with this plan and add to the construction of portions of this 33,000-volt system.

The distribution system planned for San Fernando Valley is being built in sections to conform to the demands made upon the Bureau by the consumers for power. During the year that portion of the lines from San Fernando Power House to River Power House has been completed and consists of a single circuit of 3 No. 3/0 copper conductors, and, in passing through the town of Van Nuys, is looped through the substation.

The following work has been done toward building the proposed 33,000-volt system in Los Angeles and San Pedro:

The old Edison 15,000-volt line from Substation No. 5, routed by way of the Boyle Heights District to Substation No. 1, has been completely reinsulated; the old poles, where rotted off and in bad shape were replaced, and the line is now operating at 33,000 volts. The west San Pedro line was routed into the old Edison Substation at San Pedro. The old Vineyard Substation line from Sierra Vista and Wilton Place to Vineyard Substation was reinsulated and brought up to our present standard practice.

The 33,000-volt lines which have heretofore terminated at Sierra Vista and Wilton Place have been rerouted, and brought to the new substation site at Vine and Romaine Streets. This has required the construction of a double circuit 33,000-volt line from Gower Street and Melrose Avenue to Vine and Romaine Streets; a double line from Wilton Place and Sierra Vista to Vine and Romaine Streets; a new line along Bronson Avenue along Melrose Avenue to Elmwood, and, in addition, a temporary line from the Vine and Romaine Substation site to the present Substation No. 14 at Cahuenga and Sunset Boulevard. These lines were all built with the end in view of incorporating them into the final 33,000-volt scheme.

At the beginning of the present fiscal year, we had in operation at San Pedro a single circuit Peddler line from Substation No. 3 around the west basin and east through Wilmington to the Long Beach-Los Angeles city limits. The principal load was the Water Bureau's pumping plant at Wilmington.

During the year, a number of large industrial consumers have been connected to this line and in order to insure reliable and continuous service, a double peddler line scheme has been designed. This scheme contemplates the use of the old Edison high voltage line on Anaheim Road and part of the present east San Pedro line as the second peddler line. The east San Pedro line is to be rerouted over the old Edison line to the new substation. At this time, double peddler line service has been completed to the Associated Oil Company's marine station and to the refinery of the Union Oil Company.

In connection with the proposed 33,000-volt peddler system in the metropolitan area of Los Angeles, the lines on Alameda from 15th to 25th Streets were completely reinsulated for 33,000-volt use. This was one of the most expensive places of reconstruction work encountered, inasmuch as it was necessary to build a complete shoo-fly line the entire length of this proposed line until such time as the new line could be put

into service. A new line from Third and Garry to Fourth and Central supplying the Los Angeles Ice and Cold Storage Company was built and the old line reinsulated for use at 33,000 volts, but will operate at 15,000 volts on the Edison system until we are able to make the cut-over to our system. The lines on Santa Fe Avenue and Center Street between Third and Aliso were reinsulated for 33,000-volt operation. The line from Dayton Avenue east of San Fernando Road to Loretta Avenue, then to the rock crusher at Avenue 35 and Pasadena Avenue, was reinsulated for use at 33,000 volts. A new double circuit 33,000-volt line from Substation No. 4 to 55th and Alameda was constructed for use as a Peddler circuit to supply a steel foundry at 55th and Alameda. A short extension to the Peddler system was made to supply the City Rock Crushers at San Fernando Road and Arroyo Seco. One of the old Edison lines along Sherer Street, Wilson, May, Mateo, Fourth and Santa Fe Avenue was reinsulated for use in connection with the 33,000-volt Peddler scheme. A short extension to the 33,000-volt system was made from Wilton Place and Fountain Avenue to the Warner Brothers Studios on Van Ness Avenue.

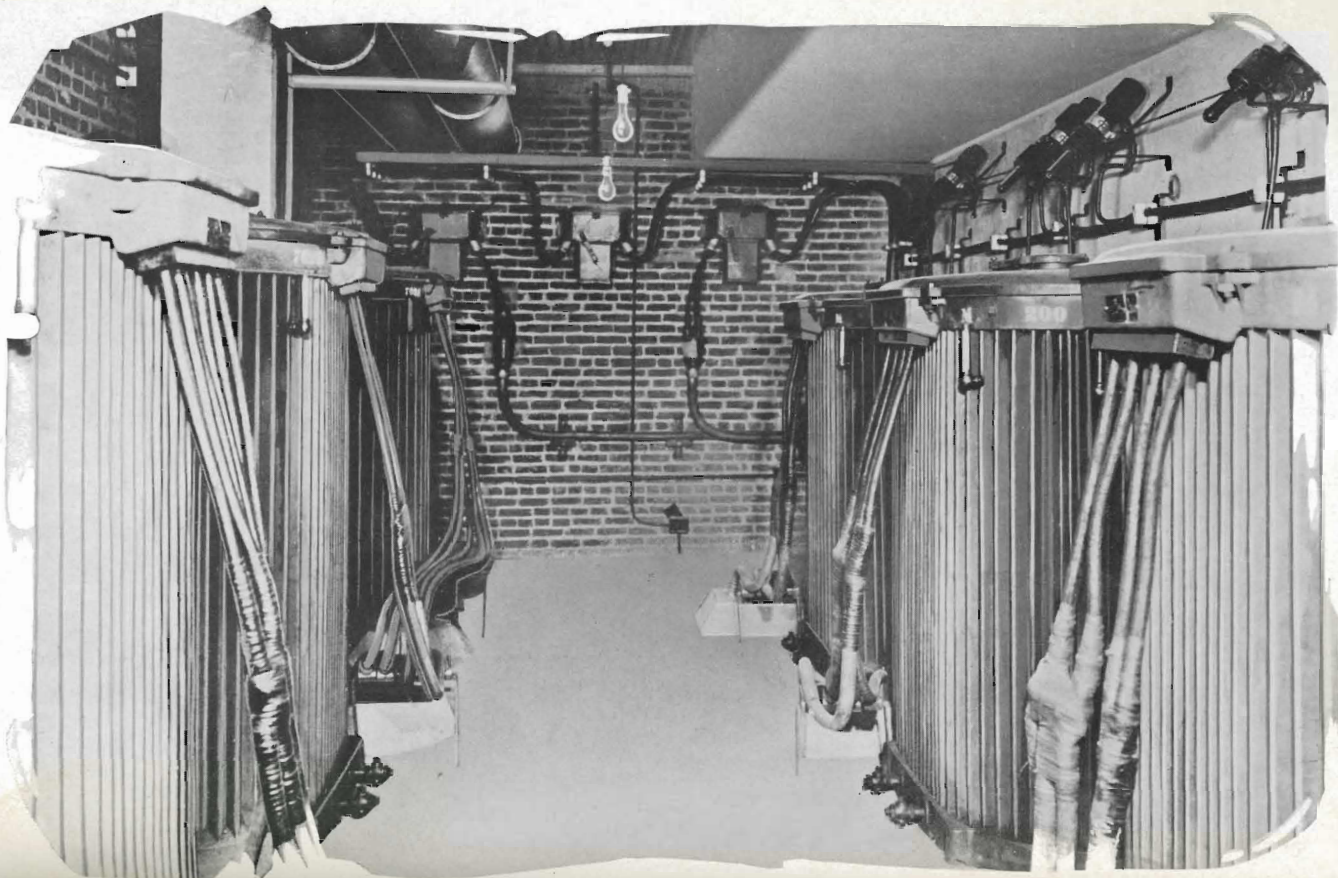
2200 and 4400 Distributing Lines

Pending the transfer of the Edison system to the city, the Edison Company of necessity did a minimum amount of reconstruction and rebuilding to meet the increased demands upon the system. Consequently, on taking over the Edison lines, it was found, almost without exception, that every feeder circuit was badly overloaded; and with an ever-increasing demand being made upon it. It was apparent that a great deal of reconstruction and rebuilding must take place at once in order to supply our consumers with the service to which they were entitled. In addition, in certain portions of the city, particularly in Garvanza, Highland Park and east Los Angeles sections, before negotiations were entered into with the Edison Company, the City had constructed a complete and adequate distributing system. In these districts one of our first steps to improve service to the public was to transfer the services, where they were fed from the old Edison system, to the more modern and up-to-date City system. In the Hollywood District we found long feeder circuits badly overloaded, and in many cases the consumer was receiving only 90 volts where he should have received 110. This condition was relieved for the time being by running additional feeder circuits from our temporary Substation No. 6A out to the badly overload sections and cutting portions of the load from these circuits to the new feeder circuits. These new feeder circuits were so laid out that they will fit into and become part of the ultimate scheme when the permanent substation in the Hollywood District is constructed.

It was necessary to transfer all the load supplied from the Edison Company's L. A. No. 3 Substation, which was not taken over by the City, to our Substation No. 1. This involved reinsulating three feeder circuits fed from L. A. No. 3 and supplying Boyle Heights District, and rerouting these lines into our Substation No. 1. This meant not only changing the feeder circuit from one substation to the other, but, also, changing all the transformers on these circuits from 2200 to 4400 volts.

In the southwestern part of the City we found it necessary to run additional feeder circuits from Substation No. 4 out to the heavily located districts, and to divide the load on the old feeders, throwing portions of it on to these new ones. The same condition prevailed in the western part of the City, and, to a certain degree, in the closer-in districts. The entire Harbor District, except the residential and business district of San Pedro, has been reinsulated, transformers changed and is now operated at 4400 volts.

The transformers in the overhead system were badly overloaded, many being found with overloads as great as three hundred and four



UNDERGROUND TRANSFORMER VAULT SUPPLYING 1800 H.P. LOAD TO LARGE DEPARTMENT STORE IN COMMERCIAL CENTER

hundred per cent. An unreasonable number of fuses were being blown daily and a great number of transformers were being burned out. To correct this condition, an active campaign of testing was put into effect and a large number of dangerously loaded transformers were changed before actual failure. This resulted in an improvement in the number of fuses blown and transformers burned out.

During the year, in the 2200-volt and 4400-volt overhead system, there were removed 2468 transformers having a total capacity of 39,307 K.V.A. and installed 3689 transformers having a total capacity of 58,210 K.V.A. This is a net gain of 1221 transformers having a capacity of 18,903 K.V.A.

UNDERGROUND SYSTEM

Metropolitan Business District

The underground distribution system in the down-town districts, as obtained by purchase from the Southern California Edison Company, was in a severely overloaded and greatly depreciated condition. Everywhere the cables and transformers were badly overloaded. The manholes and vaults were badly crowded and in some cases in such shape as to make it almost suicidal for a man to work in them. To relieve this condition required a large construction program.

Conduit Line

More than four miles of new conduit line, averaging 12 ducts each, have been constructed. Many of the existing conduit lines were filled with cables and new lines were constructed to provide for the increase in number and size of conductors.

The old Edison conduit lines, and a portion of the Pacific Light and Power Company's conduit lines taken over in the purchase agreement, were found to be of 3-inch and 3½-inch duct construction, yet the greater portion of the Pacific Light and Power Company's conduit lines were of wood construction and so badly decayed as to be unfit for use.

With the advance in the art of cable manufacture, very much larger cables than were formerly possible are now being made on a commercial scale. The present limit of the overall diameter is approximately 3½ inches; for this reason, we have standardized on 4-inch fiber conduit for all general distribution duct lines and 4½-inch fiber for 35,000-volt duct lines. It was noticed that in the larger duct lines a very great temperature difference existed between the ducts in the interior of the duct line and those on the outside. A study was made of this condition covering a period of a year and a half. It was found that a large part of this temperature drop was in the narrow concrete bridges between the fibre duct, as at this point the heat conducting area is very small. A study of the correct spacing between ducts was made in the test laboratory and it was found that the temperature rise conditions in the interior of the duct line could be very materially improved by a very slight increase of spacing. At the present time, all conduit lines of over twelve ducts have two inches of concrete between ducts and all conduit lines of less than twelve ducts have one inch separation between ducts. The results of these studies have made it possible to greatly increase the carrying capacity of our large duct lines.

Sixty new manholes were constructed. It was found necessary to rebuild thirty-eight manholes to provide ample space for old and new cables and safe working conditions for employees.

These manholes are of two general standardized types: one being a service manhole where only the ducts for service cables enter the manhole; the other being the manhole where all cables enter and pass

through same. All manholes are constructed with 8-inch brick walls laid in cement mortar, 4-inch concrete floor with 8-inch sump tile, 12-inch concrete roof reinforced with rails and 30-inch diameter round head and double cover. The conduit lines entering manholes are recessed with 15-inch radius-curved opening to facilitate racking of cables.

It has been found very difficult to completely standardize on the size of manholes, due to the congested conditions that exist under the streets. The service manholes are $4\frac{1}{2}' \times 5' \times 5\frac{1}{2}'$ deep inside dimensions, and the standard manhole $5' \times 7' \times 6'$ deep.

Transformer Vaults

Eighteen new transformer vaults of standard design have been constructed and two old vaults rebuilt. Standard transformer vaults are $7' \times 16' \times 9\frac{1}{2}'$ deep, inside dimensions. They are built of 8" brick walls laid in cement mortar, 4" concrete floor with cable trench for secondary cables, transformer base, 12" concrete roof reinforced with rails, and 40" square head, cast steel cover and a sub-cover. The wall opposite the transformers is recessed to provide suitable clear space for racking through cables. Two 8" tile vents run from the vaults to the sidewalk back of curb, with cast iron perforated cover, serving to pass air from the street through the vault. A No. $1\frac{1}{2}$ Sirocco blower driven by a $\frac{1}{4}$ H. P. 3-phase 220-volt specially designed motor attached to the intake vent discharges fresh air directly onto the cases of the transformers.

Each vault is equipped with two 300-ampere single throw 7500-volt weatherproof type oil switches connected by disconnecting lugs to the 5000-volt primary bus attached to the ceiling. One oil switch is located at either end of the bus and connected to the primary cable through a pothead. A bracket supports an improved type of cut-out for each transformer. All transformers of 75 K.V.A. capacity, or larger, are provided with a resistance unit in parallel with one cut-out for disconnecting transformers under load and for testing transformers without interrupting the load.

Several special transformer vaults have been built in the basements of large commercial buildings. As an example, a vault was constructed in the basement of the Broadway Department Store which is $14' \times 27' \times 8\frac{1}{2}'$ high inside dimensions. Its equipment comprises three 250 K.V.A. transformers for lighting service and three 200 K.V.A. transformers for power service, with oil switches, cut-outs and bus cables for supplying all the service requirements of this large store.

Subway Transformers

A large majority of the transformers in the underground system had been greatly overloaded and had operated for long periods of time at oil temperatures from 85°C to 110°C .

During the year we have removed 67 badly overloaded transformers, totaling 2500 K.V.A. To replace these and to take care of new business, connected to the system a total of 117 40°C rise subway type transformers, totaling 8200 K.V.A. were installed.

The results of average temperature conditions obtained in the new vaults equipped with 40°C rise transformers, as compared with the old vaults equipped with old transformers, and under similar loading are as follows:

Vault	Vault Temp. $^{\circ}\text{C}$	Trans. Oil Temp. $^{\circ}\text{C}$	Ventilation
New	22	44	Artificial
Old	33	71	Artificial

Primary Cables

The old primary cable system was very inadequate, due to rapid increase in load without addition of new cables. Some cables were operating at 105% overloads with 120°C sheath temperature in some heavily loaded conduits. Resultant cable failures were frequent and interruption to service a great annoyance.

A new cable system has been designed and two sizes of primary cables have been standardized on for use in the business district, namely: 3 conductor—500,000 C.M., sector shape, 5000-volt cable for all main feeders and 3-conductor, No. 2/0, 5000-volt cable for all branches. During the year nine miles of such primary cables have been installed.

Primary feeder cables of 500,000 C.M. size are installed on the east and west streets, with four way junction boxes placed at the street intersections, with No. 2/0 branch cables installed on the north and south streets. Where two transformer vaults are situated in one block, one vault normally operates on each feeder, but may be transferred to either feeder by operating the oil switches in the vault. The feeder cables on any one street are continuous between two substations and are normally operated as two separate feeders by removing the clips in any one junction box. This provides a very flexible means of transferring load in case of cable failure or where it is desired to make repairs or changes on the cables or equipment.

Low Voltage Cables

Twenty miles of 600-volt, single conductor, paper-insulated cables have been installed during the year. The low voltage cables have been standardized in the following sizes: No. 1/0, No. 4/0, 500,000 C.M., 1,000,000 C.M. and 1,500,000 C.M. These cables have reinforced the existing secondary and direct current systems, and provided capacity for service to new business connected. The direct current cable system was greatly overloaded, the cables were operating at high temperatures and line losses were large. The new cables have materially reduced these losses and lowered the cable temperature.

Station No. 1

The enlargement of the Central Receiving Station No. 1 required changes in the method of routing the underground feeders. Three new manholes and 350 feet of conduit line were constructed and arrangements made for handling the feeder cables. Plans are prepared to provide ample conduit facilities for all possible future feeder and 35 K.V. cable lines.

35 K.V. Conduit Line

Designs of manholes and conduit for 35 K.V. underground feeders between Central Receiving Station No. 1 and Substation No. 12 have been prepared. This conduit line will carry eight 4½-inch fiber ducts for the 35 K.V. cables and eight 2½-inch fiber ducts for control circuit cables. It is of the U-section type with full exposure to the earth for all ducts. The center of the U is ample in size to accommodate a 6-inch cast iron water main, packed in earth, for supplementing natural heat conduction where necessary. The average span between manholes is 275 feet; where right angle turns are made, the conduit is laid on 35-foot and 65-foot radius curves. This is done to permit passing the cables through the manholes without bending to facilitate splicing and fireproofing.

The 35 K.V. cable has been purchased and delivered. Two lengths are of the belted type and the third length is of the Hochstadter type employing electrostatic shields. Little is known, in this country, of the Hochstadter cable from an operating point of view, but it is very promising theoretically. The belted type cable was intended to be the

best that it was possible to produce, at the present state of the art. It incorporates three very important features, namely: that of thin paper, open spiral taping and very viscous impregnating compound.

Residential Underground

There are eight tracts in the residence district that have underground combination electric and telephone systems, four of which have been built during the past year. These are designed with double man-holes and conduit lines so as to keep separated the electric lines from the telephone. This has been developed to put underground service into residential tracts at a minimum of expense.

Standard drawings and specifications covering the construction of the manholes, transformer vaults, conduit lines and service laterals for such tracts have been made and approved by the Bureau and the Southern California Telephone Company.

When tract owners desire to construct an underground system, a proposed layout of the system is made by our engineers in conjunction with the engineers of the Telephone Company. This layout, together with blue prints of standard plan and specification, is furnished to the tract owner for his guidance in construction. Inspection is made at frequent intervals during construction. The cable system is designed and installed by the Bureau.

SUBSTATIONS

The outstanding feature of the year's work, in connection with substations, was the building of two modern substations, No. 3 at San Pedro and No. 9 at Francisco Street. The station at San Pedro is practically completed, and the station at Francisco Street will be operating by November 1st. These two stations are the first of the new standardized unit type to be constructed. Substations have been standardized into three classes as follows:

Class I

This class is designed for alternating current service only, in connection with synchronous condensers for voltage control or power factor correction.

Class II

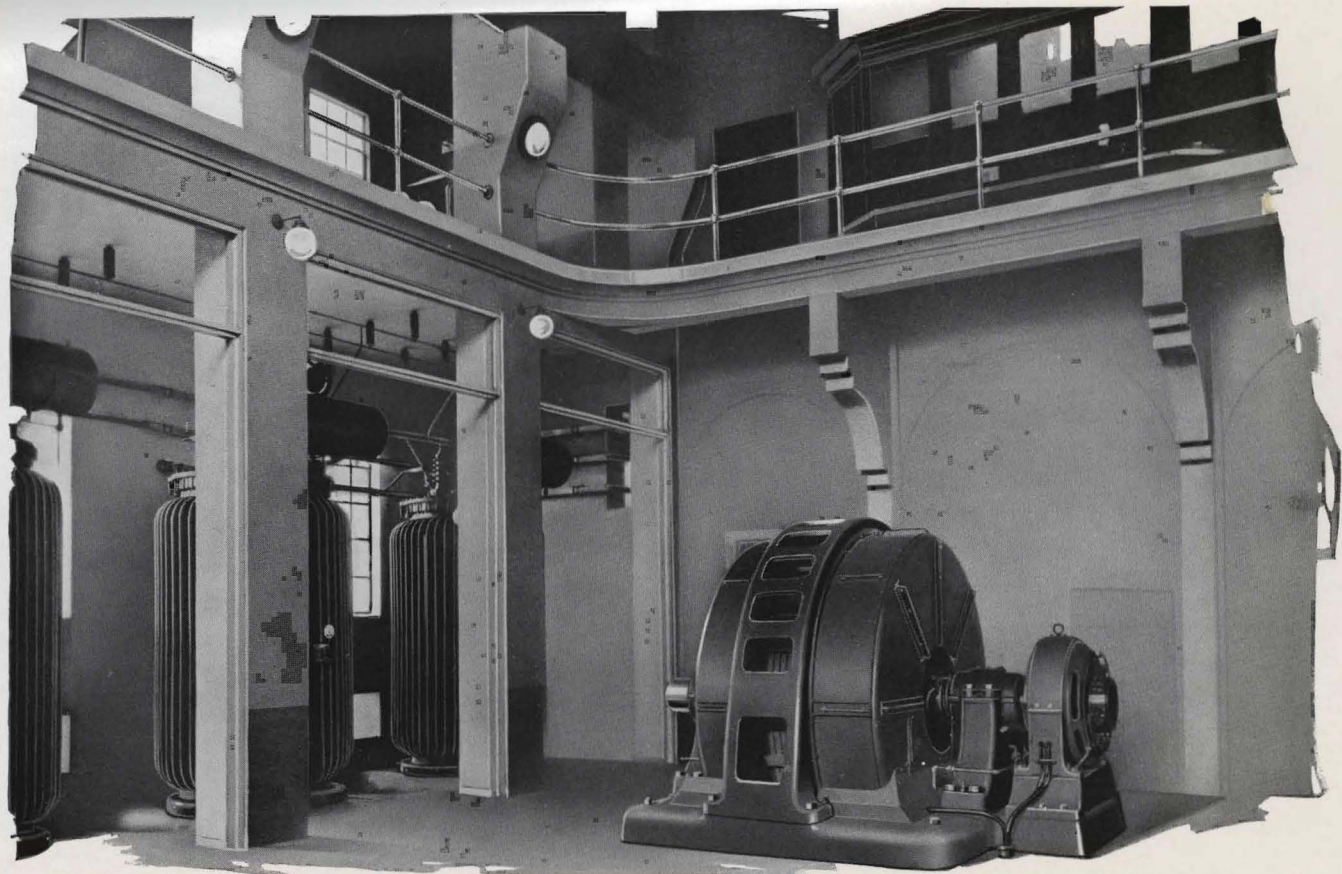
This class is designed for both alternating and direct current service and is substantially the same as Class I with the addition of a basement, for the accommodation of the direct current switch gear.

Class III

This class is designed for alternating current service only, and no space is provided for rotating machinery.

The above classes of substations are very similar and are designed on the unit plan of extending the feeders. One unit will accommodate two high voltage lines and eight regulated feeders. Two units will accommodate six high voltage lines and sixteen feeders. Three units will accommodate ten high voltage lines and twenty-four feeders. Four units will accommodate fourteen high voltage lines and thirty-one feeders. The standard regulated feeder has a capacity of 1100 K.V.A. at 10 per cent regulation or 2200 K.V.A. at 5 per cent regulation.

The buildings for these substations are two stories in height and are of reinforced concrete construction. The architectural features of any of these stations can be greatly varied without changing the internal arrangement of the apparatus. Some of the features embodied are as follows: the high tension lines operating at 33,000 volts can enter or leave the station either overhead through the roof or under-



INTERIOR VIEW, DISTRIBUTION STATION NO. 3. HARBOR BOULEVARD AND REGAN STREET, SAN PEDRO DISTRICT

ground through insulated cables. Conduit arrangements for high line relay protection are installed at each oil switch to allow the use of either direct series trips, internal oil circuit breaker current transformers or external current and potential transformers, or a combination of either. The high tension layout consists of double busses and oil circuit breakers. The two busses are located in separate compartments and can be sectionalized and isolated from each other. The oil circuit breakers are also located in separate compartments and isolated by fireproof walls and doors. Each circuit breaker compartment is also equipped with a large oil drain, which, in case of a switch tank exploding, will drain the oil into an outdoor sump tank from which the oil can again be reclaimed. The circuit breakers are all remote electrically operated from the switchboard. The low tension room (2200 or 4400 volts) contains the oil circuit breakers, main busses, transfer bus and feeder regulators. There is a double main bus and each feeder can be fed from either bus through a double set of disconnecting switches and one oil switch. There is also a transfer bus by which feeders may be paralleled, allowing the oil switches and feeder regulators to be taken out of service, without interruption of the service to the feeder. The oil switches are located in separate fireproof compartments with an oil pit in the bottom of each compartment. These breakers are also remote electrically operated from the switchboard. The main busses are fed from the transformer banks through overhead bars and double oil switches enabling either transformer bank to be connected to either main bus by the operator at the switchboard. The feeder regulators are cooled by a ventilation system consisting of a blower at the end of a large tile main installed in the ground under the first floor. From this main, smaller tile ducts connect and radiate. Each duct enters through the floor into the center of a square formed by four feeder regulators. On the end of these smaller ducts, which are flush with the floor, is inserted an adjustable head for regulating the amount and velocity of the escaping air. The head is of such design as to direct the escaping air at an angle and against the regulator tanks.

There are two transformer rooms providing for two banks of transformers, each of 5000 K.V.A. self-cooled, or two banks, each of 15,000 K.V.A. water-cooled. The vaults are provided with sloping floor and pit, with oil drain into the before-mentioned oil sump. Conduits are installed at each transformer for temperature indicators to be read at the switchboard and for high temperature alarm. The rooms are ventilated by means of outside air intakes and exhaust fans.

Concrete tunnels 5'x6½' in cross section and running practically the full length of the buildings are built in the ground outside of the station. All the low tension feeders and street light circuits leave the station underground and enter this tunnel, where a flexible racking system allows the different feeders to leave the tunnel for their destination in any desired direction.

A standard system of phasing or numbering of all the busses, disconnecting switches, oil switch, terminals, etc., is used and is similar in all the stations, permitting any station operator or electrician to tell at a glance the different phase positions, allowing speed and accuracy in making repairs or replacements.

In the operator's room, which is practically noiseless, and fireproof, is located the control bench and instrument board, as well as the station service and storage battery control board. From this room the operator has control of every piece of apparatus in the station. The stations are provided with an automatic lighting system which throws part of the station lighting over to the station storage battery, in case of interruptions on the system.

Temporary Distribution Substations

It has been found necessary to build temporary substations for the immediate relief of overload conditions. A design has been developed, using wooden studding and corrugated iron. It will provide for a transformer capacity of 5000 K.V.A., seven regulated feeder positions and three 33,000 volt lines.

Under this type of design a temporary substation known as No. 25, located at Hyperion and Riverside Drive, was constructed, having installed 4000 K.V.A. of transformer capacity, and four 4400-volt feeders, two of which are regulated. It is also proposed to erect a similar substation at 35th Place and Normandie Avenue to be known as No. 13B. This station will have 3000 K.V.A. of transformer capacity, supplying four feeders all arranged for automatic regulation. This station will also provide switching positions for three 33,000-volt lines.

RECONSTRUCTION OF EXISTING SUBSTATIONS

Substation No. 1

Due to the contemplated reconstruction of this station, the feeders in the south room have been transferred to the north room and three additional standard feeders provided to take care of the six feeders taken from the Edison Company's L. A. No. 3 Station.

Edison Station L. A. No. 3

This station remained the property of the Edison Company under the purchase agreement, making it necessary for us to move our equipment. Therefore, we transferred the six 2200-volt feeders from this station to our Station No. 1. This transfer also necessitated a change from 2200 to 4400 volts, which permitted us to consolidate these six feeders into three.

Substation No. 2

At this station the transformer capacity was increased from 750 K.V.A. to 1800 K.V.A. The wiring was rearranged, two sections added to the switchboard and one additional 150-ampere feeder regulator installed.

Substation No. 3A

The old Edison San Pedro Substation was changed from 10,000 volt to 33,000-volt operation. 100 K.V.A. of transformers were installed.

Substation No. 4

The old Edison Substation L. A. No. 7, located at Figueroa and Slauson Avenue, was abandoned and removed and the three feeders in it transferred to our Substation No. 4. Four additional feeders were also installed and 1800 K.V.A. of additional transformer capacity added.

Substation No. 5

One additional standard feeder was installed and one street light regulator changed from 2200 to 4400 volts.

Substation No. 5A

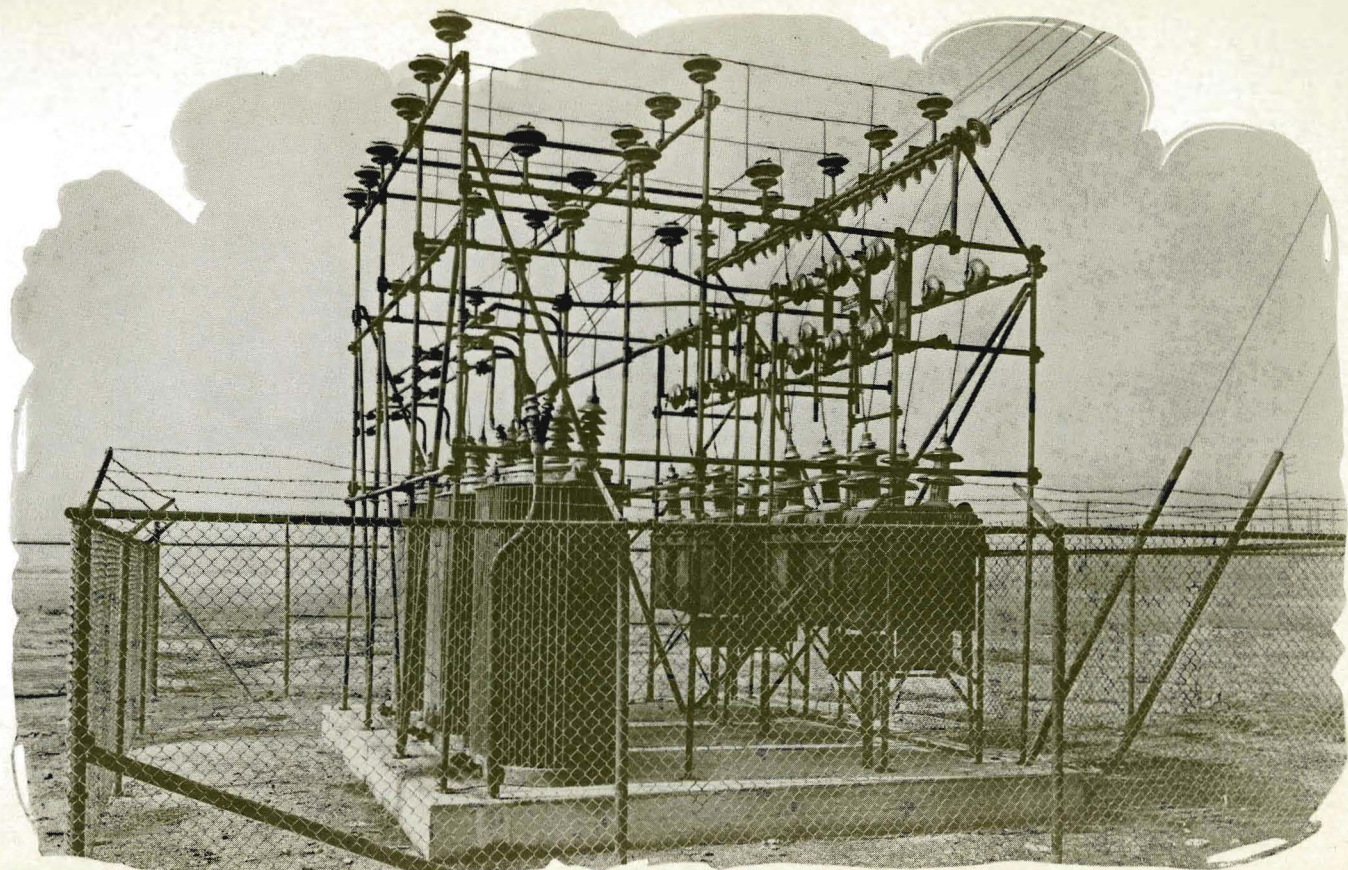
This station was changed from 15,000 volts to 33,000 volts operation and 6000 K.V.A. of transformer installed. Two mercury act rectifiers were installed for municipal street lights.

Substation No. 6A

One additional feeder and one street light regulator was installed.

Station No. 10

Two old 2-phase hand-operated regulators were replaced with two sets of standard automatic feeder regulators. In a short time all the remaining 2-phase from this station will be changed to 3-phase.



TYPICAL 33,000 VOLT OUTDOOR INDUSTRIAL STATION

Substation No. 11

This station was completely cut over from 15,000 volts to 33,000 volts operation and an additional transformer capacity of 3000 K.V.A. added.

Substation No. 12

This station was changed from 15,000 to 33,000 volts operation and 15,000 K.V.A. of transformers installed. The outgoing 2200-volt feeder cables were changed because of their badly overloaded condition.

Substation No. 14

Three thousand K.V.A. of transformer capacity was added to this station and two street light regulators were installed, replacing four old regulators.

Industrial or Consumers' Substations

A number of industrial type substations have been developed and standardized to accommodate different voltages, transformer sizes and space allotted on property of the consumer. The different types of stations consist of the following:

Single Circuit 33,000 volts

Type A	0 - 750 K.V.A.	square type
Type B	0 - 750 K.V.A.	long type
Type C	750 to 1500 K.V.A.	square type
Type D	750 to 1500 K.V.A.	long type
Type E	2000 to 3000 K.V.A.	square type
Type F	2000 to 3000 K.V.A.	long type

Double Circuit 33,000 volts

Type G	750 to 1500 K.V.A.
Type H	2000 to 3000 K.V.A.

2200 or 4400 volts

Type J	0 - 750 K.V.A.	square type
Type K	0 - 750 K.V.A.	long type
Type L	750 to 1500 K.V.A.	square type
Type M	750 to 1500 K.V.A.	long type
Type N	0 - 600 K.V.A.	outdoor type

For all these substations, sets of building drawings have and are being made. A set of each design will be approved by, and kept on file in the City Building Department. A set of blue prints will then be given to the consumer for construction, of whatever size he selects, and by applying to the Building Department the consumer will ask for a permit on a certain number which covers the particular style of station he desires to build and it will be issued to him without the customary filing of duplicate sets of blue prints and loss of time. Twenty-four of these industrial substations have been completed and placed in operation during the past year, totaling 14,525 K.V.A. of transformer capacity. Up to date, we have eighty-seven industrial substations in operation, in which are installed 231 transformers having an aggregate capacity of 53,141 K.V.A.

STREET LIGHTING SYSTEM

Extensions to the Distribution System for street lighting purposes have kept pace with the growth of the City. The most notable accomplishment during the year has been the removal of 1405 enclosed arc lamps, now obsolete, and their replacement by modern series incandescent type units. The resulting illumination is 380 per cent of that with the old equipment. This new type of lamp consumes less energy than the old which permits 20 per cent more lamps to be supplied from the present regulating transformers in the stations.

New street lighting regulators, having a capacity each of 150 lights, were installed as follows:

Hollywood Substation No. 6A, one regulator.

University Substation No. 13A, one regulator.

Alvarado Substation No. 15, one regulator; replacing two rectifier outfits which were moved to Porter Street Substation No. 5A.

In all districts existing circuits have been filled up to capacity with new installations and in addition it was necessary to construct new circuits.

From Substation No. 2 one new 75-light circuit was constructed and put in operation to provide for requirements in York Valley.

From Substation No. 6A a new 150-light circuit was constructed and put in service to provide lights in the South Hollywood section.

From Substation 13A a new 150-light circuit was constructed and put in service to relieve the overloaded condition of the circuits from Substation No. 4. The new circuit feeds the district directly west of Exposition Park.

Two former magnetite circuits on the L.A.G. & E. Corporation lines in the South Hollywood district have been converted to incandescent type and the magnetite lamps used on two new L.A.G. & E. Corporation circuits in Boyle Heights.

Several small isolated and "fringe" systems have been incorporated in the general overhead street lighting system.

Contracts have been let for furnishing sixty-four ornamental luminous arc lamps for use on Broadway between Tenth and Pico Streets, and for a rectifier outfit for supplying the required direct current to operate the lamps.

There has been considerable activity in new ornamental systems during the year. Higher candlepower lamps and higher voltage cables have permitted the use of larger capacity pole type regulating transformers.

During the fiscal year 23 ornamental systems of 879 standards have been connected, necessitating the installation of 310 K.V.A. of pole type constant current transformers.

The following is a summary of the series street lights, exclusive of the ornamental lights:

MUNICIPAL SYSTEM

Kind	80 C.P.	250 C.P.	600 C.P.	1000 C.P.
Total Lights June, 1923.....	2322	224	3195	3
Net Increase During Year.....	82	15	351	0

MUNICIPAL LIGHTS ON L.A.G. AND E. SYSTEM

Kind	Carbon Arc	Magnetite	Novalux
Total Lights June, 1923.....	0	1293	1659
Net Increase During Year.....			1630
Net Decrease During Year.....	1405	129	

SERVICES AND METERS

The following is a summary of the year's operations affecting services and meters:

Services Installed	28,800
Services Repaired	7,845
Services Removed	3,998
Meters Set	29,154
Meters Set—Re-set M.O.....	98
Meters Fuse Up	34,795
Meters Pull Fuse	47,404
Meters Removed	5,515
Meters Changed	2,469
Meters Read—Re-read	74,542
Meters Tested	1,553
Miscellaneous Orders	43,213



DISTRIBUTION STATION NO. 3, HARBOR BOULEVARD AND REGAN STREET, SAN PEDRO DISTRICT

Business Agents' Division

BURDETT MOODY, *Business Agent in Charge*

In rendering the usual annual report one year ago, after taking over the distributing lines and city business of the Southern California Edison Company, the opinion was expressed that the Bureau of Power and Light might find itself embarrassed during the then coming year because of a large amount of deferred work which would be demanded for extensions and enlargements necessary for subdivisions where electric service was not enjoyed. The prediction was far too conservative. The tremendous growth and demand for electric service in the City of Los Angeles has passed all previous records.

It is realized that reliance is placed by utility corporations upon long-term loans or bonds to provide for extensions and betterments to the system. The Bureau of Power and Light, on the other hand, unfortunately finds itself, at present, dependent solely upon surplus revenues to accommodate the various demands. Consequently, the general program of the expansion work of the City's commercial business has been necessarily a restrictive one. This finds its most direct application when studying the requirements of large prospective industries.

THE GROWTH OF INDUSTRIES AND INDUSTRIAL POWER LOAD IN LOS ANGELES

The growth of Los Angeles industrially is indicated by the demands for power service. There were many new industries located here during the year, with requirements amounting to thousands of horsepower, while nearly as large demands for power service has been made by reason of the growth of established industries.

For the fourteen months following the purchase of the Southern California Edison Company system there was close to 48,000 horsepower permanently added, of which 32,000 horsepower was for new industries and 16,000 horsepower for old consumers, and in addition there was 11,000 horsepower connected for installations of a temporary character. This increase equals one-third of the total connected load of the Edison Company city system at the beginning of the year.

Of the new industries the largest industrial requirements for power were made in the lumber and oil industries. Of the former we supplied new and additional power amounting to over 5000 horsepower, with applications waiting for an equal amount.

In the oil industry we supplied over 6000 horsepower to new and established companies, with 5000 horsepower waiting in demand.

HARBOR DISTRICT

The Harbor District has continued to show the greatest ratio of annual growth in demands for power over all other districts. In the San Pedro district for the fiscal year just closing there were added 2122 light and power consumers of a total connected load in excess of 10,000 horsepower and required a capital expenditure of nearly \$300,000.00.

In the oil industry alone in the harbor, we supplied 4000 horsepower new installations with additional requirements for established refineries amounting to 2000 horsepower.

Applications of oil companies on hand now will require 5000 additional horsepower.

One of the important industrial installations in Los Angeles during the year was 1800 horsepower for a new steel plant, including a complete electric foundry, consisting of two 3-ton 1000-kilowatt electric furnaces,

an electric oven for core baking, and a 400-kilowatt electric annealing oven, with electric welding equipments, magnets and cranes.

An equal capacity was furnished to a new large cotton mill now planning to double its capacity.

Other plants of similar work are being promoted, and there is no doubt that the requirements of such industries will be more than double during the coming year, providing that the situation as to power supply does not automatically limit the growth of industrial expansion.

ELECTRIC VEHICLES

There has been considerable success in the marketing of electric trucks and there is now in Los Angeles a total of 227. One hundred forty-six of this number were placed in operation this year. The battery charging current for these vehicles resulted in approximately 225 kilowatts additional load, and it is especially valuable business as it is used entirely off the peak.

WOODWORKING PLANTS

Soon after taking over the Southern California Edison Company system we had many inquiries from the woodworking industry, due to the large development of direct motor-connected machinery which was designed entirely for maximum speed and production of 3600 r.p.m. with 60-cycle motors. We have arranged that most of these customers, through sale to them of frequency changers that would allow for 80 to 100 cycle operation of their present motor equipment, have secured a much larger production for the machines.

SYNCHRONOUS MOTORS

This department has made further progress in the installation by consumers of synchronous motors. Including installations in pumping plants of the water department there has been added nearly 1000 horsepower in this type of motor equipment.

COMBINATION LIGHTING, COOKING AND HEATING

As of June 30, 1923, results of the combination lighting, cooking and heating rate adopted in February, 1923, show an active total of 283 such consumers with a connected load, exclusive of light and lamp socket devices, of 2012 K.W., including 254 ranges, 100 water heaters and 122 miscellaneous devices, such as space heaters, domestic water pumps, etc. Based on three months' billing, April, May and June, 1923, the total average annual consumption for 283 such consumers is 811,004 kilowatt hours, with a total gross revenue of \$25,620.72, an average of \$0.0316 per kilowatt hour. The average monthly bill is, therefore, \$7.54 for 239 kilowatt hours. The average bill for range is only \$5.96 for 175 kilowatt hours; for range and water heaters, \$8.87 for 291 kilowatt hours; for water heater only, \$4.44 for 119 kilowatt hours.

In addition to the foregoing there are some 103 ranges installed in apartment houses on straight power rate, bringing the total number of ranges in domestic use to 237.

COMPARATIVE STATEMENT OF METERS IN SERVICE

The following is a comparative statement of meters in service on June 30th of the last four years, indicating the growth of the municipal system.

Lighting Meters	1920	1921	Municipal Only	1922	1923
				Municipal Plus Edison Purchase	
Residence	10,841	13,065	16,997	(Not class- (classi- fied (June (30th, (1922	136,569
Commercial and Industrial	826	1,041	1,615		14,293
Municipal	99	102	113		788
Post Lighting Systems	4	4	4		43
Special Park Systems	3	4	4		21
Sub Meters	59	64	64		2,814
Total Lighting Meters	11,832	14,280	18,797	129,363	154,528
Per Cent Increase over previous year		21%	31%		19%
Power Meters					
Residence	14	14	21	(Not classi- (fied (June 30th, (1922	373
Commercial and Industrial	270	371	592		7,101
Municipal	61	61	64		765
Total Power Meters....	345	446	667	7,193	8,239
Per Cent Increase over previous year		29%	49%		15%
Total Lighting and Power Meters, June 30th, 1923.....	162,767				

It seems again appropriate to once more include the following as quoted from the annual report for each of the last two years. "The effort of the Business Agent's Division necessarily has not been directed primarily to the encouragement of large industrial enterprises of a new kind, pending the perfection of plans for the acquisition of a large block of relative cheap hydro-electric power from the Colorado River. The consummation of definite plans for adequate power supply of low cost must necessarily precede such efforts."

Continuing evidence of a convincing sort has accumulated in this office leading to the conviction that it needs but the stimulating effect of an assured future power supply from the Colorado River, available to industries at municipal rates, to assure the establishment in Los Angeles of certain great basic or key industries.

The rounding out of this city into a large metropolitan district of diversified industries by such means will assure continued growth and prosperity of Los Angeles, commercially and otherwise.

But the foundation for this growth must be laid by first entering into actual possession of the source of supply of power, reliable, economical and adequate for a reasonable future need.

It must be reliable so as to furnish good service to the consumer.

It must be economical to the consumer, otherwise large industries of importance cannot live here.

It must be adequate, otherwise there cannot be assured stability in rates or in service.

None of these three essentials can be guaranteed or expected as long as the City continues to be dependent upon purchasing power from other agencies, as at present.

APPENDIX "A"
DEPARTMENT OF PUBLIC SERVICE
BUREAU OF POWER AND LIGHT
OPERATING DIVISION

REPORT OF GENERATION AND DISTRIBUTION FOR FISCAL YEAR 1922-1923.

Month	GENERATION												DISTRIBUTION			
	Municipal System						Purchased						Grand Total K. W. H.	Total Dist. K. W. H.	Peak K. W.	L. F. %
	P. P. No. 1 K. W. H.	P. P. No. 2 K. W. H.	San Fernando K. W. H.	River K. W. H.	Franklin K. W. H.	Pasadena K. W. H.	Total K. W. H.	Peak K. W.	L. F. %	S. C. E. Co. K. W. H.	Peak K. W.	L. F. %				
July 1922.....	14,802,200	8,826,000	—	303,130	768,000	0	24,699,330	57,600	57.6	2,386,869	12,743	25.1	27,086,199	25,299,826	58,168	58.5
August.....	12,417,700	7,139,000	—	160,710	794,000	1,149,200	21,660,610	57,100	50.9	8,061,356	34,414	31.5	29,721,966	28,195,748	60,190	62.9
September.....	9,530,900	5,212,000	—	24,580	805,000	1,346,800	16,919,280	46,000	51.0	12,402,202	30,107	57.2	29,321,482	27,967,647	66,979	57.9
October.....	10,532,600	5,685,000	695,400	80,220	767,000	934,900	18,695,120	50,200	50.0	13,626,876	26,523	69.0	32,321,996	30,755,296	69,577	59.3
November.....	9,474,500	5,073,000	2,082,400	863,780	550,000	1,223,100	19,266,780	57,900	46.2	13,123,180	31,242	58.3	32,389,960	30,749,110	74,964	56.9
December.....	11,155,200	6,230,000	2,126,500	1,252,350	587,000	994,400	22,345,450	64,300	46.7	11,501,102	23,589	65.5	33,846,552	32,011,186	79,316	54.2
January 1923.....	14,684,600	8,332,000	1,856,000	1,171,560	665,000	32,900	26,742,060	63,300	57.0	9,387,890	17,901	70.4	36,129,950	34,069,543	76,915	59.5
February.....	11,945,500	6,770,000	2,557,700	1,024,000	489,000	17,000	22,803,200	63,700	53.3	8,677,863	36,384	35.4	31,481,063	29,636,459	74,216	59.3
March.....	13,274,100	7,438,000	3,400,000	733,840	698,000	2,900	25,546,840	63,600	54.0	9,637,767	24,586	52.7	35,184,607	33,188,673	75,708	58.9
April.....	11,849,500	6,592,000	2,795,000	847,580	578,000	2,600	22,664,680	58,200	54.0	10,683,519	25,181	58.9	33,348,199	32,020,012	75,444	58.9
May.....	11,838,800	6,600,000	3,046,400	76,710	847,000	1,500	22,410,410	60,000	50.2	11,857,582	24,227	65.7	34,267,992	32,366,533	72,124	60.3
June.....	11,995,000	6,747,000	3,003,600	41,110	815,000	900	22,602,610	57,300	55.0	10,895,614	21,538	70.2	33,498,224	31,534,828	72,477	60.4
Total 1922-1923....	143,500,600	80,644,000	21,563,000	6,579,570	8,363,000	5,706,200	266,356,370	64,300	47.2	122,241,820	36,384	38.4	388,598,190	368,778,861	79,316	52.9

*—Energy involved in interchange with 7th Street Improvement Co.

Report of Right of Way and Land Agent

July 1, 1923.

Honorable Board of Public Service Commissioners,
The City of Los Angeles.

Gentlemen:

I beg to submit herewith a brief summary of such activities of the Right of Way and Land Department during the fiscal year ending June 30, 1923, as we have been able to classify:

Parcels of land purchased..... 66

This comprises some 30 lots purchased for use of the Bureau of Power and Light at an approximate cost of \$160,025, and 13 lots and 317.21 acres in Los Angeles County for use of the Bureau of Water Works and Supply, at an approximate cost of \$580,196.78, and 6,946.77 acres together with all the water rights pertaining to said land, in Inyo County, at an approximate cost of \$906,744.00.

Parcels of land sold.....	5
Leases made on City land (53 applications).....	34
Tree trimming permits secured.....	254
Power line easement deeds.....	96
Pipe line easement deeds.....	26
Power line permits (distribution) 2,500, verbal 43.....	2,543
Railroad crossing agreements, pipe lines.....	31
Railroad crossing agreements, power lines.....	22
Torrens Title and Quitclaim cases searched.....	85
Lost demand cases handled.....	29
Automobile accidents investigated.....	390
Damage claims against Department.....	120
Damage claims against outsiders.....	57
Fire hydrants damaged.....	66
Sales of salvage.....	7
Personal injury cases, employes.....	1,054
Personal injury cases, outsiders.....	21
Death of animals.....	3
Complaints, miscellaneous.....	16
Miscellaneous agreements.....	32
Unclassified cases.....	60

The following is a statement of personal injury cases of employes of the Department of Public Service cared for under the provisions of the Workmen's Compensation Insurance and Safety Act, during the fiscal year 1922-23, showing the amount of money expended in connection with such cases. The item of "Medical Expenses" includes services of physicians, hospitals, surgical appliances and drugs:

Number of cases fiscal year 1922-23.....	1,054
Number of accidental deaths.....	2
Number of cases paid compensation insurance.....	183
Number of cases given medical treatment.....	878
Medical expenses.....	\$25,717.25
Compensation insurance.....	25,407.05
Miscellaneous expenses.....	392.81
Total.....	\$51,517.11

This Department has also checked bi-monthly the medical supplies contained in 132 First Aid Kits which are maintained at the different camps, power houses, pumping houses, pumping plants, etc., sending out a total of 3,184 requisitions for this purpose, in order to keep the kits supplied with medicines for use in emergency.

Respectfully submitted,

JOHN T. MARTIN,
Right of Way and Land Agent.

Report of Controller

December 28, 1923.

To the Honorable Board of Public Service Commissioners,
Building.

Gentlemen:

I beg to submit herewith the financial statements of the funds controlled by this Department for the fiscal year ending June 30, 1923, as follows:

Water Revenue Fund

Power Revenue Fund

Electric Plant Bond Elec. 1914 Fund.

Respectfully submitted,

L. M. ANDERSON,

Controller.

LMA:b
encl.

**WATER REVENUE FUND
CASH TRANSACTIONS
Year Ending June 30, 1923**

Balance in Fund July 1, 1922.....

\$164,717.90

RECEIPTS

Returned to Fund Account of Cancellation of Demands and Pay

Checks		\$78,424.42
LOS ANGELES OFFICE		
Water:		\$ 3,465,086.66
Domestic	\$ 3,461,508.50	
Irrigation	3,578.16	
Meter Installations.....		294.00
Service Installations.....		262,173.00
Temporary Services.....		3,919.89
Meter Changes.....		34,247.00
Service Changes.....		24,734.00
Street Main Assessments.....		627,043.23
Permits for Construction Work.....		39,457.55
Miscellaneous Collections.....		68,602.94
Accounts Payable:		138,067.45
Consumers' Guarantees.....	47,532.78	
Street Main Deposits.....	90,534.67	
Bills Collectible:		2,438,295.97
Miscellaneous Collections.....	2,333,735.96	
Subsistence Collectible.....	229.73	
Meter Installations.....	26.25	
Meter Repairs.....	5,117.41	
Miscellaneous Rentals.....	11,735.61	
Salvaged Material or Equipment Sold.....	1,163.48	
Service Installations.....	46,777.96	
Owens Valley Rentals.....	25,547.55	
Street Main Assessments.....	13,962.02	
Total Los Angeles Office.....		7,101,921.69
SAN PEDRO OFFICE		
Water:		\$ 154,724.75
Domestic	\$ 154,724.75	
Service Installations.....		23,570.00
Temporary Services.....		548.00
Meter Changes.....		45.50
Service Changes.....		641.00
Street Main Assessments.....		39,979.05
Permits for Construction Work.....		1,567.54
Miscellaneous Collections.....		1.32
Accounts Payable:		7,233.24
Consumers' Guarantees.....	2,073.00	
Street Main Deposits.....	4,868.24	
Meter Deposits.....	292.00	
Bills Collectible:		17,697.26
Miscellaneous Collections.....	6,347.83	
Meter Repairs.....	520.33	
Service Installations.....	9,291.99	
Street Main Assessments.....	1,537.11	
Total San Pedro Office.....		246,007.66
VAN NUYS OFFICE		
Water:		\$ 213,768.76
Domestic	\$ 66,628.10	
Irrigation	147,140.66	
Service Installations.....		11,283.00
Temporary Services.....		242.50
Meter Changes.....		85.00
Service Changes.....		20.00
Street Main Assessments.....		41,574.39
Permits for Construction Work.....		474.54
Extension Connections.....		220.00
Accounts Payable:		12,974.45
Consumers' Guarantees.....	1,024.00	
Street Main Deposits.....	11,918.45	
Meter Deposits.....	32.00	
Bills Collectible:		8,937.71
Miscellaneous Collections.....	1,555.41	
Service Installations.....	7,382.30	
Total Van Nuys Office.....		289,580.35
SAN FERNANDO OFFICE		
Water:		\$ 230,767.12
Domestic	\$ 44,523.70	
Irrigation	186,243.42	
Service Installations.....		6,098.00
Temporary Services.....		40.00
Service Changes.....		93.00
Street Main Assessments.....		11,515.17
Permits for Construction Work.....		100.79
Extension Connections.....		225.00
Miscellaneous Collections.....		85.85
Accounts Payable:		12,393.37
Consumers' Guarantees.....	252.50	
Street Main Deposits.....	12,140.87	
Bills Collectible:		4,802.75
Miscellaneous Collections.....	96.55	
Service Installations.....	4,706.20	
Total San Fernando Office.....		266,121.05
OWENSMOUTH OFFICE		
Water:		\$ 212,056.01
Domestic	\$ 20,991.76	
Irrigation	191,064.25	
Service Installations.....		6,437.00
Temporary Services.....		120.50
Meter Changes.....		13.00
Service Changes.....		12.00
Street Main Assessments.....		6,487.19
Permits for Construction Work.....		206.34
Extension Connections.....		405.00
Accounts Payable:		24,646.20
Consumers' Guarantees.....	382.00	
Street Main Deposits.....	24,187.20	
Meter Deposits.....	77.00	
Bills Collectible:		4,714.31
Service Installations.....	4,714.31	
Total Owensmouth Office.....		255,097.55
INDEPENDENCE OFFICE		
Owens Valley Light and Power Collections.....		\$ 94,820.71
Total Independence Office.....		94,820.71
EAGLE ROCK OFFICE		
Water:		\$ 4,924.90
Domestic	\$ 4,924.90	
Service Installations.....		1,206.00
Meter Changes.....		36.00
Service Changes.....		18.00
Permits for Construction Work.....		12.07
Accounts Payable:		15.00
Consumers' Guarantees.....	15.00	
Total Eagle Rock Office.....		6,211.97
Total Receipts.....		\$8,338,185.40
Total Receipts and Cash on Hand.....		\$8,502,903.30

DISBURSEMENTS

Demands Nos. 1 to 11,537, inclusive:		8,397,226.01
Material and Supplies.....	\$ 2,746,349.31	
Salaries and Labor.....	2,500,886.27	
Freight and Express.....	61,725.37	
Miscellaneous	3,088,265.06	
Cash on Hand June 30, 1923.....		105,677.29
Total Disbursements and Cash on Hand.....		\$ 8,502,903.30

*Included in Total Receipts is an amount of \$2,136,695.31 received on Internal Transfers.

BALANCE SHEET

ASSET ACCOUNTS

Total Capital (in completed work).....		\$58,087,379.34
Cash:		137,227.29
Controller	\$ 27,000.00	
Cashier	4,550.00	
Water Revenue Fund.....	105,677.29	
Accounts Receivable		1,676,246.72
Material and Supplies.....		1,005,220.05
Suspense Accounts*		1,574,190.80
Construction Work in Progress.....		1,278,076.84
Transactions with City		36,000.00

\$63,794,341.04

LIABILITY ACCOUNTS

Funded Debt		\$20,107,000.00
Accounts Payable		2,523,058.91
Reserve for Accrued Depreciation		7,002,603.88
Gifts for Public Improvement.....		5,118,245.36
Corporate Surplus Unappropriated.....		14,031,294.67
Water Works 1922 Fund Capital Adjustments.....		2,000,000.00
Investment, City of Los Angeles.....		13,012,138.22

\$63,794,341.04

*Included in Suspense Accounts is the sum of \$1,245,034.50 to cover material contracted for but not delivered.

DETAIL OF BALANCE SHEET ACCOUNTS

Total Capital in Completed Work

Collecting System		\$30,074,969.88
Distribution System		18,317,781.67
Los Angeles District.....	\$15,306,467.90	
San Pedro District.....	1,022,542.67	
San Fernando Valley	1,280,464.42	
Westgate District.....	574,139.10	
Eagle Rock District.....	134,167.58	
Purification System		6,680.20
General (Including Lands)		5,368,946.62
Irrigation System		2,915,089.60
Pumping System		658,011.42
Owens Valley Farms and Ranches*		129,742.28
Owens Valley Light and Power System.....		616,157.67

Total..... \$58,087,379.34

*Charged to this account are buildings, fences, ditches and equipment on lands which were farmed by the Department.

CONSTRUCTION WORK IN PROGRESS

San Pedro Office Building.....	\$ 47,352.43	
Protecting Dikes for Headworks Conduit.....	23,070.81	
Crystal Springs Pumping Plant and Dikes.....	31,849.30	
Riverside Pumping Plant	29,289.37	
Encino Reservoir	326,420.60	
Stono Canyon Reservoir	317,518.44	
Weid Canyon Reservoir	272,973.95	
Miscellaneous	229,601.94	

\$1,278,076.84

ACCOUNTS PAYABLE

Street Main Deposits	\$ 326,930.93	
Consumers' Guarantees.....	84,406.89	
Contracts	1,745,749.20	
Miscellaneous	365,971.89	

\$2,523,058.91

DETAIL OF ADDITIONS TO CAPITAL

During Fiscal Year

Collecting System		\$ 3,122,942.57 ^a
Distribution System		2,360,146.19
Los Angeles District.....	\$ 1,880,764.30	
San Pedro District.....	153,992.47	
San Fernando Valley	185,683.37	
Westgate District	5,538.47	
Eagle Rock District.....	134,167.58	
Purification System		2,815.74
General (Including Lands)		2,110,583.97
Pumping System		129,157.18
Owens Valley Farms and Ranches.....		12,496.08
Owens Valley Light and Power System ^b		616,157.67

\$ 8,354,299.40

^aIncluded in this amount is an amount of \$2,500,000.00, which covers Interest during construction of the Aqueduct, 1907 to 1913, account of now showing Investment of the City of Los Angeles.

^bIn previous years this account appeared as separate item on Balance Sheet as Owens Valley Light and Power System and was not included in total capital.

DETAIL OF ADDITIONS TO DISTRIBUTION SYSTEM CAPITAL

During Fiscal Year

Street Mains:		\$ 1,535,465.31
Los Angeles District.....	\$ 1,240,693.30	
San Pedro District.....	104,994.48	
San Fernando Valley	113,505.42	
Westgate District	3,133.00	
Eagle Rock District.....	73,139.11	
Fire Hydrants:		33,327.85
Los Angeles District.....	28,285.93	
San Pedro District.....	1,804.61	
San Fernando Valley	2,945.05	
Eagle Rock District.....	292.26	
Meters:		283,936.53
Los Angeles District.....	232,240.07	
San Pedro District.....	23,240.28	
San Fernando Valley	75.75	
Eagle Rock District.....	28,380.43	
Services:		372,910.90
Los Angeles District.....	263,238.56	
San Pedro District.....	22,910.61	
San Fernando Valley	64,803.47	
Westgate District	2,405.47	
Eagle Rock District.....	19,552.79	

Meter Shop Equipment		903.42
Field Equipment		26,514.71
Storage Plants		137,400.23
Miscellaneous		30,312.76*

*RED

\$ 2,360,146.19

ACCOUNTS RECEIVABLE

Power Revenue Fund.....	\$742,472.08	
Electric Plant Bond Election, 1914 Fund	1,475.00	
Municipal Improvement District No. 3 Bond Fund.....	45,679.06	
Water Works Bond Election, 1922 Fund	3,435.00	
Owens Valley Light and Power Bills	22,294.38	
Bills Collectible	430,518.29	
Service Bills—Domestic Water	381,050.67	
Los Angeles District.....	\$352,396.88	
San Pedro District	10,677.94	
Van Nuys District	7,681.40	
San Fernando District.....	5,935.85	
Owensmouth District	2,296.95	
Eagle Rock	2,061.65	
Service Bills—Irrigation Water	49,322.24	
Los Angeles District.....	298.65	
Van Nuys District.....	12,449.85	
San Fernando District.....	23,202.70	
Owensmouth District	13,371.04	\$1,676,246.72

PUBLIC IMPROVEMENT DISTRICTS

(Classified as "Gifts for Public Improvements" and taken
into Capital Accounts.)

Los Angeles County District No. 3.....	\$2,694,962.69	
Municipal Improvement District No. 1.....	1,020,000.00	
Municipal Improvement District No. 2.....	390,000.00	
Municipal Improvement District No. 3.....	160,370.39	
Municipal Improvement District No. 11.....	699,250.00	
Miscellaneous	153,662.28	
		\$5,118,245.36

MATERIAL AND SUPPLIES

Material Accounts (General Warehouse and Field Material).....	\$ 786,822.02	
Stations	61,747.78	
Stamps	968.58	
Salvaged Material	50,522.46	
Aqueduct Salvage	105,159.21	
		\$1,005,220.05

INCOME ACCOUNT

Operating Revenues	\$6,076,330.24	
Non-Operating Revenues	148,974.20	
		\$6,225,304.44
Operating Expenses	1,703,096.57	
Depreciation	1,029,433.15	
Covered by Re-		
serve (See		
Statement)	\$1,003,949.96	
Covered by Re-		
serve Owens		
Valley Light &		
Power System....	17,920.81	
Realized		
Depreciation ...	7,562.38	
Non-Operating Revenue		
Deductions	66,086.11	
		2,798,615.83
Balance for year carried to		
Corporate Surplus or De-		
ficit		\$3,426,688.61

CORPORATE SURPLUS OR DEFICIT ACCOUNT

Revenue Surplus.....	\$ 3,426,688.61	
Miscellaneous Additions to		
Surplus	264,337.70	
		\$ 3,691,026.31
Miscellaneous Deductions		
from Surplus.....		93,364.74
Net Surplus.....		\$ 3,597,661.57

DETAIL OF CORPORATE SURPLUS UNAPPROPRIATED

Surplus as of June 30, 1922..	\$20,071,313.26	
Added account Interest dur-		
ing construction not pre-		
viously carried in accounts	2,500,000.00	
Added account of difference		
between free water fur-		
nished City and payments		
made by City for Bond Re-		
demption.		
See Investment of City of		
Los Angeles below.....	874,458.06	
Net Surplus current fiscal		
year	3,597,661.57	
		\$27,043,432.89
Deducted to show Invest-		
ment, City of Los Angeles,		
not previously carried in		
Department accounts.....	13,012,138.22	
Corporate Surplus Unappro-		
priated		\$14,031,294.67

DETAIL OF OPERATING REVENUES AND EXPENSES

Revenues	
Earnings from Commercial Sales	\$ 3,814,654.06
Earnings from Sales to Municipal Departments (Estimated Water furnished to City Free).....	450,000.00
Earnings from Sales for Irrigation	539,840.72
Earnings from Industrial Sales	44,215.41
Miscellaneous Earnings from Operations	1,218,171.81
Other Operating Revenues....	9,448.24
	\$ 6,076,330.24
Expenses	
General Expenses.....	\$ 387,799.19
Less Joint Operating Expense, Credit.....	137,179.89
	\$ 250,619.30
Commercial Expenses.....	678,764.47
Less Joint Operating Expense, Credit.....	323,477.22
	355,287.25
Promotion Expenses.....	10,218.47
Pumping System Expenses...	251,916.98
Distribution System Expenses	349,146.06
Less Distribution System Removals	25,394.45
	323,751.61
Collecting System Expenses..	255,853.73
Purification System Expenses	16,363.58
Irrigation System Expenses..	113,386.49
Suspense Expenditures.....	941.69
Engineering Expense.....	52,520.16
Taxes	52,519.24
Interest and Premiums.....	19,718.07
	\$ 1,703,096.57
Excess of Operating Revenues over Operating Expenses	\$ 4,373,233.67
Less: Estimated Water Furnished City Free	\$ 450,000.00
Depreciation	1,029,433.15
	\$ 1,479,433.15
Net Available Revenue.....	\$ 2,893,800.52

DETAIL OF OPERATING REVENUES

	Commercial Sales	Irrigation Sales	Industrial Sales	Miscellaneous	Total
Los Angeles	\$3,515,473.93	\$ 3,534.61	\$ 41,854.13	\$1,056,315.60	\$4,617,178.27
San Pedro	158,081.68		1,567.54	72,396.37	232,045.59
Van Nuys	67,211.25	148,896.26	474.54	59,673.48	276,255.53
San Fernando	46,637.95	194,054.25	100.79	21,184.31	261,977.30
Owensmouth	21,919.55	192,558.00	206.34	16,520.19	231,204.08
Westgate				290.10	290.10
Eagle Rock	5,329.70		12.07	1,240.00	6,581.77
Independence and Mojave.....		797.60			797.60
Free Water furnished other					
Municipal Departments (Estimated).....				450,000.00	450,000.00
Total	\$3,814,654.06	\$ 539,840.72	\$ 44,215.41	\$1,677,620.05	\$6,076,330.24

DETAIL OF NON-OPERATING REVENUES AND DEDUCTIONS

REVENUES

Rentals, Lands and Buildings, Sales of Gravel, etc. (City System)	\$31,515.75	
Equipment Rentals and Mis- cellaneous	3,585.83	
Revenue from Ranch Prod- ucts.....	486.90	
Ranch Products Transferred..	359.20	
Rent of Farms and Ranches..	29,649.83	
Owens Valley Light and Power Revenues	83,376.69	
		\$148,974.20

DEDUCTIONS

Expense of Lands and Build- ings Rented (City System)	\$ 258.17	
Owens Valley Farms and Ranches	11,519.14	
General Supervision.....	\$5,478.12	
Repairs to Buildings and Fences	2,516.89	
Repairs to Ditches.....	3,289.46	
Farming Expense.....	234.67	
Owens Valley Light and Power Expense	54,308.80	66,086.11
Excess of Non-Operating Revenues over Non-Operating Deductions		\$82,888.09

DETAIL OF GENERAL EXPENSES

General Management Expenses.....	\$157,569.13	
Less Joint Operating Expenses.....	51,955.19	\$105,613.94
Accounting Expenses.....	101,512.75	
Less Joint Operating Expenses.....	46,808.97	54,703.78
Law Expenses.....	80,552.48	
Less Joint Operating Expenses.....	38,415.73	42,136.75
Injuries, Damages, etc.....		41,729.70
Insurance Premiums.....		1,553.86
Repairs to Buildings.....		1,019.01
Special Assessments.....		3,862.26
Total		\$250,619.30

DETAIL OF COMMERCIAL EXPENSES

Los Angeles District.....	\$585,274.70	
Less Joint Operating Expenses.....	277,117.01	\$308,157.69
San Pedro District.....	40,861.68	
Less Joint Operating Expenses.....	20,430.93	20,430.75
Van Nuys District.....	24,317.48	
Less Joint Operating Expenses.....	12,108.72	12,208.76

San Fernando District.....	14,804.46	
Less Joint Operating Expenses.....	7,402.22	7,402.24
Owensmouth District	12,836.68	
Less Joint Operating Expenses.....	6,418.34	6,418.34
Westgate District		208.27
Eagle Rock District		461.20
Total		\$355,287.25

DETAIL OF PUMPING SYSTEM EXPENSES

Name of Plant	Maintenance Expense	Operating Expense	Total
Buena Vista	\$ 8,504.92	\$ 44,025.91	\$ 52,530.83
Headworks	1,326.67	27,942.44	29,269.11
Crystal Springs	2,102.43	20,467.33	22,569.76
Edendale	114.92	12,733.68	12,848.60
Garvanza	260.37	9,700.99	9,961.36
Slauson	1,138.07	13,514.10	14,652.17
Figueroa	2,605.54	18,052.02	20,657.56
Pollock	646.74	4,997.14	5,643.88
Wilmington	4,197.59	38,355.19	42,552.78
Hollywood	152.28	10,454.24	10,606.52
Avenue 43	512.78	4,241.37	4,754.15
Gaffey	109.30	5,081.36	5,190.66
Ivanhoe		5,967.71	5,967.71
Mission	1,601.41	4,590.48	6,191.89
Seventh Street	18.52	7,221.09	7,239.61
Mead	2.80	677.90	680.70
Eagle Rock	9.00	590.69	599.69
	\$23,303.34	\$228,613.64	\$251,916.98

DETAIL OF DISTRIBUTION SYSTEM EXPENSES

Storage Plants	
Buena Vista	\$ 1,920.90
Solano	1,015.79
Elysian	252.16
Hazard	11.44
Garvanza	9.72*
Ivanhoe	2,518.46
Rowena	1,728.66
Silver Lake	4,928.15
Edendale	12.63
Bellevue	2,550.53
San Pedro	1,299.74
Franklin (Hollywood)	8.17
Seven Hundred Foot	39.74
Western Avenue	122.84
San Pedro High	57.26
Stone Canyon	228.37
Finley	77.32
Eagle Rock	13.77
	\$ 16,776.21
Miscellaneous	
Repairs to Transmission and Distribution Mains	\$ 81,642.06
Repairs to Fire Hydrants.....	3,978.69
Meter Department Administration.....	23,763.00

Meter Shop Expense.....	40,456.96	
Meter Department Field Expense.....	27,848.73	
Repairs and Renewals of Services.....	146,041.59	
Repairs to Field Equipment.....	7,099.42	
Miscellaneous	1,539.40	
	<u>\$332,369.85</u>	
Less Distribution System Removals.....	\$ 25,394.45	
		<u>\$306,975.40</u>
		<u>\$323,751.61</u>

DETAIL OF COLLECTING SYSTEM EXPENSE**Maintenance and Operation**

Intake	\$ 2,189.72	
Canals	18,663.93	
Conduits	20,175.04	
Flumes	41.63	
Tunnels	60,061.91	
Siphons	18,267.17	
Miscellaneous	935.17	
Haiwee Reservoir	5,089.79	
Fairmont Reservoir	4,713.74	
Dry Canyon Reservoir.....	2,908.62	
Compressor Plant	823.04	
Mt. Whitney Pumping Plant.....	3,804.41	
Miscellaneous Structures (Aqueduct).....	8,466.79	
Miscellaneous Equipment (Aqueduct).....	14,674.60	
San Fernando Siphon.....	1,698.40	
Franklin Tunnel	18.77	
Franklin By-Pass	165.25	
Cahuenga Trunk Line	1,146.42	
Chatsworth Conduit	2,994.52	
San Fernando Reservoir	2,111.86	
Upper Franklin Reservoir.....	5,023.21	
Lower Franklin Reservoir	4,918.25	
Chatsworth Reservoir	4,367.86	
Pacoima Reservoir	1,337.07	
Upper San Fernando Reservoir.....	1,742.89	
Miscellaneous Structures (Sub-Aqueduct).....	219.99	
Headworks Conduit	2,990.01	
Crystal Springs Gallery	161.61	
Crystal Springs Conduit.....	942.32	
Buena Vista Gallery.....	324.35	
Miscellaneous Structures	149.82	
General Supervision (Independence).....	25,238.28	
General Supervision (Mojave).....	25,786.59	
Telephone Lines	13,700.70	
		<u>\$255,853.73</u>

RECAPITULATION OF CHARGES FOR DEPRECIATION**For Fiscal Year**

Collecting System Capital.....	\$ 418,983.33
Distribution System Capital.....	428,438.86
Purification System Capital.....	154.57
General Capital	68,330.59
Irrigation System Capital	56,719.59
Pumping System Capital.....	18,768.00
Owens Valley Farm and Ranch Capital.....	5,757.69
Completed Construction not transferred to Capital.....	6,797.33
	<u>\$1,003,949.96</u>

WATER WORKS BONDS

	Year Issued	Rate	Term	Original Amount	Redeemed Since Last Report	Outstanding June 30, 1923
Water Works Improvement.....	1895	4.5 %	40 yrs.	\$ 30,000.00	\$ 750.00	\$ 9,750.00
Water Works	1901	3.75%	40 yrs.	2,000,000.00	50,000.00	950,000.00
Water Works	1904	3.75%	27 yrs.	337,500.00	12,500.00	100,000.00
Water Works Reservoir.....	1904	3.75%	40 yrs.	150,000.00	3,750.00	78,750.00
Water Works	1905	4. %	40 yrs.	1,500,000.00	37,500.00	862,500.00
Water Works	1907	4. %	40 yrs.	1,033,600.00)	.....	.....
Water Works	1907	4.5 %	40 yrs.	21,964,000.00)	676,400.00	16,910,000.00
Water Works	1913	4.5 %	35 yrs.	1,500,000.00	50,000.00	1,100,000.00
Water Works	1916	5. %	35 yrs.	58,000.00*	.....	58,000.00
Water Works	1921	6. %	40 yrs.	38,000.00*	.....	38,000.00
				\$28,611,100.00	\$830,900.00	\$20,107,000.00

*Represents the balance due on Water Works Bonds of City of Eagle Rock at time of annexation to City of Los Angeles, not original amount of Bonds Issued.

POWER REVENUE FUND

CASH TRANSACTIONS Year Ending June 30, 1923

Balance in Fund July 1, 1922.....\$ 266,615.83

RECEIPTS

Returned to Fund account of Cancellation of Demands and Pay Checks.....		\$ 129,310.23
Light:	\$5,141,041.25	
Los Angeles	\$4,812,783.87	
San Pedro	252,847.91	
Van Nuys	50,793.42	
San Fernando	9,736.41	
Owensmouth	14,879.64	
Power:	2,457,670.70	
Los Angeles	2,124,582.70	
San Pedro	281,817.13	
Van Nuys	12,889.97	
San Fernando	32,962.42	
Owensmouth	5,418.48	
Combination:	4,818.86	
Los Angeles	1,670.71	
Van Nuys	1,742.86	
San Fernando	312.20	
Owensmouth	1,093.09	
Sales:	15,827.13	
Los Angeles	13,566.24	
San Pedro	910.05	
Van Nuys	1,228.18	
San Fernando	122.66	
	\$7,619,357.94	
Southern California Edison Company Operating Agreement		27,164.07
Miscellaneous Collections		27,486.26
		\$7,674,008.27
Accounts Payable:		
Consumers' Guarantees	27.23	
Miscellaneous Deposits	10,975.98	
Bills Collectible:		
Miscellaneous Collections (Includes collections from Other Department Funds).....	1,841,597.83	
Line Extension Deposits.....	98,497.96	
Subsistence Collectible	1,145.60	
Miscellaneous Rentals	4,052.54	
Sale of Lamps.....	17,378.21	
		9,776,993.85
Total Receipts*		\$10,043,609.68

DISBURSEMENTS

Demands Nos. 1 to 10,407, inclusive:		\$9,851,521.63
Materials and Supplies.....	\$4,347,060.70	
Salaries and Labor.....	3,236,575.10	
Freight and Express.....	147,251.30	
Miscellaneous	2,120,634.53	
		192,088.05
Cash on Hand June 30, 1923.....		192,088.05
Total Disbursements and Cash on Hand.....		\$10,043,609.68

*Included in Total Receipts is an amount of \$2,311,207.34 received on Internal Transfers.

BALANCE SHEET**ASSET ACCOUNTS**

Total Capital (Plant and Equipment).....	\$30,968,604.14	
Material and Supplies.....	2,203,899.48	
Accounts Receivable.....	847,452.82	
Cash Deposited with U. S. Dist. Court.....	525,000.00	
Available Cash:		
Controller	\$ 14,000.00	
City Treasurer.....	192,088.05	
		206,088.05
Deferred Charges.....		589,404.39
		<u>35,340,448.88</u>

LIABILITY ACCOUNTS

Funded Debt.....	\$21,300,000.00	
Accounts Payable.....	2,782,559.29	
Unamortized Premium on Bonds.....	299,865.41	
Reserve for Depreciation.....	981,976.53	
Investment City of Los Angeles.....	3,552,843.89	
Surplus	6,423,203.76	
		<u>\$35,340,448.88</u>

DETAIL OF TOTAL CAPITAL

Distribution Capital.....	\$16,888,366.36	
General Capital.....	562,340.58	
Landed Capital.....	598,729.89	
Production Capital.....	7,694,468.77	
Transmission Capital.....	1,462,356.46	
Construction Work in Progress.....	3,762,342.08	
		<u>\$30,968,604.14</u>

DETAIL OF ADDITIONS TO CAPITAL

(Completed during fiscal year)

Distribution Capital.....	\$ 1,934,696.65	
General Capital.....	295,346.67	
Landed Capital.....	312,140.01	
Production Capital.....	1,354,586.05	
Transmission Capital.....	191,847.88	
		<u>\$4,088,617.26</u>

INCOME ACCOUNT

As Compiled by Price, Waterhouse & Company

Income:

Municipal lighting.....	\$ 539,121.82	
Municipal power.....	109,569.89	
Other municipalities.....	35,438.58	
Commercial lighting.....	4,662,832.66	
Commercial power.....	2,346,454.95	
Miscellaneous	69,189.07	
		\$7,762,606.97

Deduct: Expenses:

Production	\$ 143,500.46	
Transmission	62,275.31	
Power purchased.....	1,204,798.11	
Expenses in connection with power Distributed by Department:		
Distribution	1,099,220.83	
Commercial	458,624.86	
General expenses.....	470,635.76	
		\$3,439,055.33
		\$4,323,551.64

Deduct:

Interest on bonds (less proportion of bond premium amortized).....	\$ 994,331.00	
Other interest	13,568.30	
Provision for depreciation of plant and equipment	622,029.00	
		\$1,629,928.30
Net Income.....		\$2,693,623.34

SURPLUS ACCOUNT

Revenue Surplus	\$2,693,623.34	
Miscellaneous adjustments and deductions from Surplus.....	626,275.19	
Net Surplus for year.....		\$2,067,348.15
Ledger Surplus prior to addition of Surplus for year.....		\$4,355,855.61
Surplus as of June 30, 1923.....		\$6,423,203.76

DETAIL OF OPERATING REVENUES AND EXPENSES**REVENUES**

Municipal Lighting	\$ 539,121.82	
Municipal Power.....	109,569.89	
Commercial Lighting.....	4,662,832.66	
Commercial Power	2,346,454.95	
Other Municipalities	35,438.58	
Miscellaneous	36,444.79	
	<hr/>	
Total Operating Revenue.....		\$7,729,862.69

EXPENSES

Production Expense	\$ 143,500.46	
Power Purchased.....	1,204,798.11	
Transmission Expense	62,275.31	
Distribution Expense.....	1,099,220.83	
Commercial Expense.....	458,624.86	
General Expense	470,635.76	
Accrued Depreciation	622,029.00	
	<hr/>	
		\$4,061,084.33
Excess of Operating Revenue over Operating Expense.....		\$3,668,778.36

Electric Plant Bond Election 1914 Fund

CASH TRANSACTIONS

Year Ending June 30, 1923

Balance in Fund July 1, 1922.....	\$	4,748.55
Returned to Fund Account of Cancellation of Demands.....		\$84.80

RECEIPTS

Bills Collectible:		\$1,182,550.54
Sale of Bonds.....	\$	849,000.00
Premium on Bonds.....		13,156.00
Miscellaneous Collections....		320,094.54
Miscellaneous Rentals.....		300.00
Total Receipts.....		1,182,635.34
Total Receipts and Cash on Hand....		\$1,187,383.89

DISBURSEMENTS

Demands Nos. 13769 to 13772, Inclusive		\$1,187,383.89
Miscellaneous		\$1,187,383.89
Cash on Hand June 30, 1923.....		.....
Total Disbursements and Cash on Hand		\$1,187,383.89

STATEMENT OF EARNINGS, EXPENSES, INTEREST AND SURPLUS FROM COMMENCEMENT OF OPERATIONS TO JUNE 30, 1923

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

REVENUES

	<u>Gross From Municipal System</u>	<u>Net From Operating Agreement</u>	<u>Total</u>	<u>Maintenance & Operation Expense</u>	<u>Depreciation</u>	<u>Operating Balance</u>	<u>Interest on Bonds and Other Interest</u>	<u>Other Deductions</u>	<u>Surplus</u>
Period ending June 30, 1918 (Approximately 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
Year ending 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
Year ending 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
Year ending 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
Year ending 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
Year ending 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
Total	\$11,764,089.38	\$5,523,838.54	\$17,287,927.92	\$6,427,581.16	\$1,318,018.66	\$9,542,328.10	\$2,962,110.86	\$157,013.48	\$6,423,203.76

In addition to the above surplus of \$6,423,203.76, there has been expended for power purposes from proceeds of taxation the sum of \$3,552,843.89, giving a total equity in plant and equipment of \$9,976,047.65.

