

**Fortieth Annual  
Report of the**

**Board of Water and Power  
Commissioners**

**of the  
City of Los Angeles**



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**Fiscal Year Ending June 30, 1941**

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year, total consumption was 653 second feet, of which 383 second feet represented domestic use, and 270 second feet, irrigation.

Rainfall for the past season was 32.76 inches, or 115% above normal.

Storage in all reservoirs as of June 30, 1941, amounted to 217,805 acre feet, showing a gain of 75,805 acre feet during the year.

Plans are under way for improvement of the Los Angeles River collecting and transportation system so as to develop, to the fullest extent, this local source of supply. It is proposed to replace the old main conduit and Crystal Springs conduit with facilities of sufficient capacity to handle the increased flow that will result from this development. According to present plans, this work will be undertaken during the ensuing year.

Construction of the Mono Basin extension to the Los Angeles Aqueduct was completed, and on January 1, 1941, was assigned to the Los Angeles Aqueduct Division for operation. At the close of the fiscal year, storage in the reservoirs behind the Long Valley and Grant Lake dams, which constitute part of this extension, was as follows:

Grant Lake Reservoir.....	33,267 acre feet
Long Valley Reservoir.....	36,656 acre feet

Accurate topographical surveys and re-calculations recently made to ascertain the ultimate capacity of Long Valley Reservoir established said capacity as 183,000 acre feet instead of 163,000 acre feet, as was previously estimated.

In the report of the Bureau's activities for the fiscal year 1939-40, mention was made of plans to create a new section for centralizing control over all matters pertaining to consumers' complaints regarding poor pressure, taste, faulty registration of meters, investigation of breaks and leaks in water mains and services, regulation of water supply according to requirements of the various zone areas, and other matters regarding operation of the system. Accordingly, a new section, known as the Water Distribution Control Section, was established as a part of the Water Distribution System, and is functioning very satisfactorily in the handling of these matters. By this method it has been possible to standardize procedures and coordinate all phases of these activities, thereby securing uniform and effective control and establishing more harmonious consumer relations.

The following reports by the various Division Heads of the Bureau set forth in detail information relative to additions and betterments to the distribution system, and summarize the activities of each division for the past year.

The report of water consumption as shown in the following table is the total flow into the distribution system from the storage reservoirs and groundwater production plants. The figures indicated mean flow in cubic feet per second and millions of gallons per day for the various periods.

#### REPORT OF WATER CONSUMPTION IN THE CITY OF LOS ANGELES FOR THE FISCAL YEAR 1940-41

	DOMESTIC		IRRIGATION	TOTAL
	Sec. Ft.	Mil. Gals. Per Day	Sec. Ft.	Sec. Ft.
July.....	354.8	229	206.7	561.5
August.....	330.2	213	175.9	506.1
September.....	317.0	205	118.6	435.6
October.....	290.9	188	72.3	363.2
November.....	249.7	161	37.2	286.9
December.....	219.4	142	25.2	244.6
January.....	203.3	131	2.0	205.3
February.....	202.5	131	1.0	203.5
March.....	204.9	132	1.9	206.8
April.....	221.9	143	5.8	227.7
May.....	322.9	209	45.3	368.2
June.....	340.5	220	123.2	463.7
Mean.....	271.5	175	67.9	339.4
Mean-Summer.....	314.5	203	112.6	427.1
Mean-Winter.....	228.4	148	23.3	251.7
Peak-July 8-15.....	378.0	244	238.0	616.0
Total rainfall for season.....	32.76 Inches (115% above normal)			

# Los Angeles Aqueduct

BURTON S. GRANT, *Engineer-in-Charge*

## PURPOSE AND FUNCTIONS OF DIVISION

**T**HIS Division is responsible for the delivery of Owens River and Mono Basin water to Los Angeles through the City's 350 mile aqueduct system.

It is essential that the aqueduct structures be maintained in good condition so that its maximum capacity of water can be carried safely at all times in order to insure delivery of this water at times and in quantities needed in the city. In order to meet the various operating conditions brought about by seasonal fluctuations of supply and demand, hundreds of operations of control mechanisms are made annually to regulate the delivery of this water to the city. Incidental to these functions is the operation and maintenance of appurtenant regulating reservoirs, numerous deep wells, a vast collecting and irrigating ditch system, roads, buildings, and equipment. Numerous hydraulic and general structures are constructed as needed to perfect control of the collection and transportation of water in this system.

An engineering staff administers the activities of the Division in addition to directing the making of designs, studies, surveys, and estimates; and maintains financial control and operation records.

Featuring the activities of this Division during the past year have been the inclusion of the Mono Basin Extension as part of the operating function, a large extraordinary maintenance program, and reorganization of the Southern Division of the system.

## OPERATION

The Mono Basin Extension was completed, except for minor items of work, and turned over to this Division on January 2, 1941. The new extension had functioned on several occasions, prior to this date, for the purpose of testing the new structures. The first water was diverted through the Mono Craters Tunnel to Owens River on April 24, 1940, for a test run of three days. Storage of water in Grant Lake was commenced on October 14, 1940, behind the old rock-fill dam, at which time installation of the control valve in the outlet tunnel was begun. On December 3, 1940, the approach channel was cut through the old dam allowing the water to be impounded against the new dam; and on June 30, there was in storage at this reservoir 33,267 acre feet. Water was first turned into Leevining intake on December 12, 1940, for the initial test of the structure; and permanent diversion was begun on December 14, 1940, since which time some water has been diverted continuously from Leevining Creek into Grant Lake Reservoir in varying quantities.

Although Long Valley Reservoir was not made a part of the Aqueduct Division during the year, the dam was sufficiently completed to permit the commencement of storage of water on April 25; and on June 30, there were 36,656 acre feet of water being held back in this reservoir.

During the year, the aqueduct was shut off in one section or another a total of 4,454 hours, as indicated by the accompanying tabulation. Due to the amount of extraordinary maintenance work performed, the percentage of time which the aqueduct was off exceeds that of any recent year. The shut-off in the Saugus District provided an excellent test of the extent of the City's reserve supply when no water was delivered to the City Limits for sixty-three days.

## MAINTENANCE

### AQUEDUCT

Abnormal rainfall last winter along the entire line of the aqueduct created live streams in many canyons and washes which had not run water for many years, except that resulting from cloudburst conditions. In

## Major Construction Division

H. L. JACQUES, *Engineer*

### PURPOSE AND FUNCTIONS OF DIVISION

**T**HE functions of the Major Construction Division are, briefly, as follows: The construction of major construction projects including dams, reservoirs, tanks, conduits, tunnels, pumping plants and major pipe lines in the Water Bureau system. Also to make major repairs to such structures.

In connection with the performance of the duties of this Division is involved the preparation of engineering and cost studies of proposed work, the preparation of cost records, field supervision of Department forces and supervision of work performed under contract.

### CONSTRUCTION — MONO BASIN PROJECT

The construction work handled by this Division during the past year consisted of the following:

#### GRANT LAKE RESERVOIR:

Completion of the Grant Lake Reservoir by the Macco Construction Company of Clearwater, California. The dam was accepted by the Department on December 6, 1940. To complete the contract it was required to place and roll in the dam 426,714 cubic yards of material, excavate 213,071 cubic yards of material from the spillway cut and place 2,123 cubic yards of concrete. Original bid price was \$355,322.00—actual contract cost was \$344,555.00.

#### LEEVINING CREEK TO GRANT LAKE CONDUIT AND APPURTENANT STRUCTURES:

Completion of the Leevining Creek to Grant Lake Conduit by A. Teichert and Son Inc. of Sacramento, California. The contract was completed December 14, 1940. The contract called for the construction of 32,983 linear feet of cut and cover horseshoe conduit, 3,356 linear feet of tunnels and 5,575 linear feet of 36" ID x  $\frac{5}{16}$ " welded steel pipe. The building of the Walker, Parker and Leevining Creek intake structures and gate control structure at Grant Lake. The total length of the collecting line is 42,411 linear feet including structures and transitions between various types of conduit cross sections. The work included the excavation of 361,432 cubic yards of common and 8,853 cubic yards of rock, the placing of approximately 45,000 cubic yards of concrete and 260,367 cubic yards of common backfill. Original bid price was \$806,356.00—actual contract cost \$796,892.00.

#### MISCELLANEOUS FORCE ACCOUNT WORK:

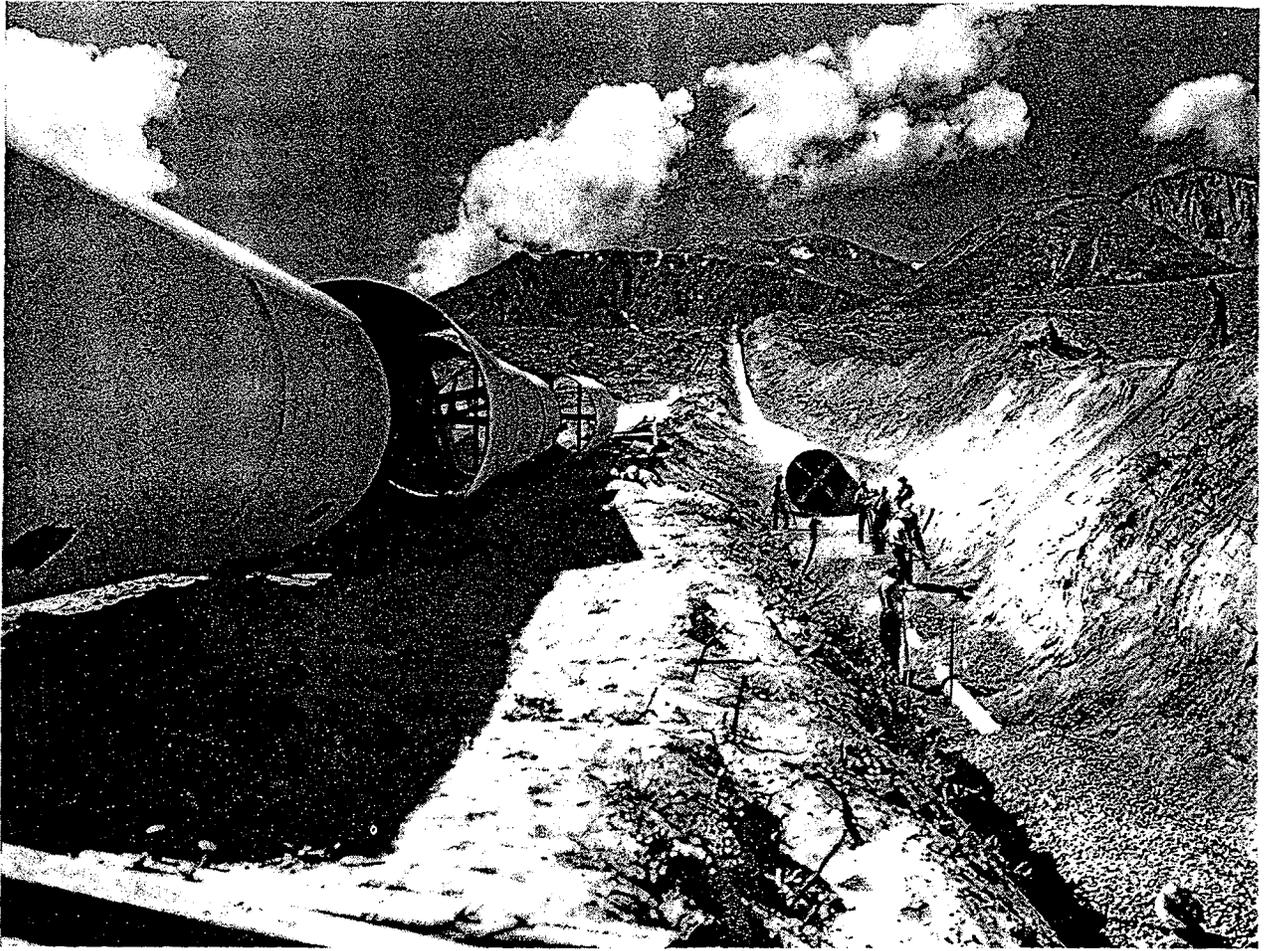
In conjunction with the contract work in the Mono Basin, Department crews removed brush and trees from the Grant Lake and Leevining Intake reservoirs sites and installed the venturi tube and control valves in the Grant Lake shaft.

### CONSTRUCTION — LOS ANGELES AQUEDUCT

#### SIPHON REPAIRS:

On August 2, 1940, this Division was placed in charge of the replacement of portions of the Los Angeles Aqueduct siphons under contract to the J. F. Shea Co. Inc. Work was completed June 13, 1941.

The contract required the complete replacement of the Dove Springs and San Antonio siphons and the replacement of all pipe with plate thickness of less than  $\frac{3}{8}$  inch on the Jawbone, Deadman and Soledad siphons. During the work, 8,049 linear feet of welded steel pipe was placed in the various siphons. This



*Farrington Siphon, shown here under construction, is part of the eight-mile Leevining to Grant Lake conduit system that collects the flow of Mono Basin streams for use by the City of Los Angeles. There is more than a mile of welded steel pipe of this type in the project.*

extension of the line connecting Rowena and Ivanhoe Reservoirs. On June 30, a little over 800 linear feet of concrete pipe had been placed and the total job was about 35% complete.

On May 20, the Department started work on the Rowena Reservoir Inlet-Outlet lines under contract with the W. P. A. Progress by June 30 consisted of the excavation of 217 linear feet of the 960 linear foot inlet tunnel, the excavation of 1,660 cubic yards of material of the 3,800 required for the outlet line and the demolishing of the old reservoir roof.

#### ENGINEERING

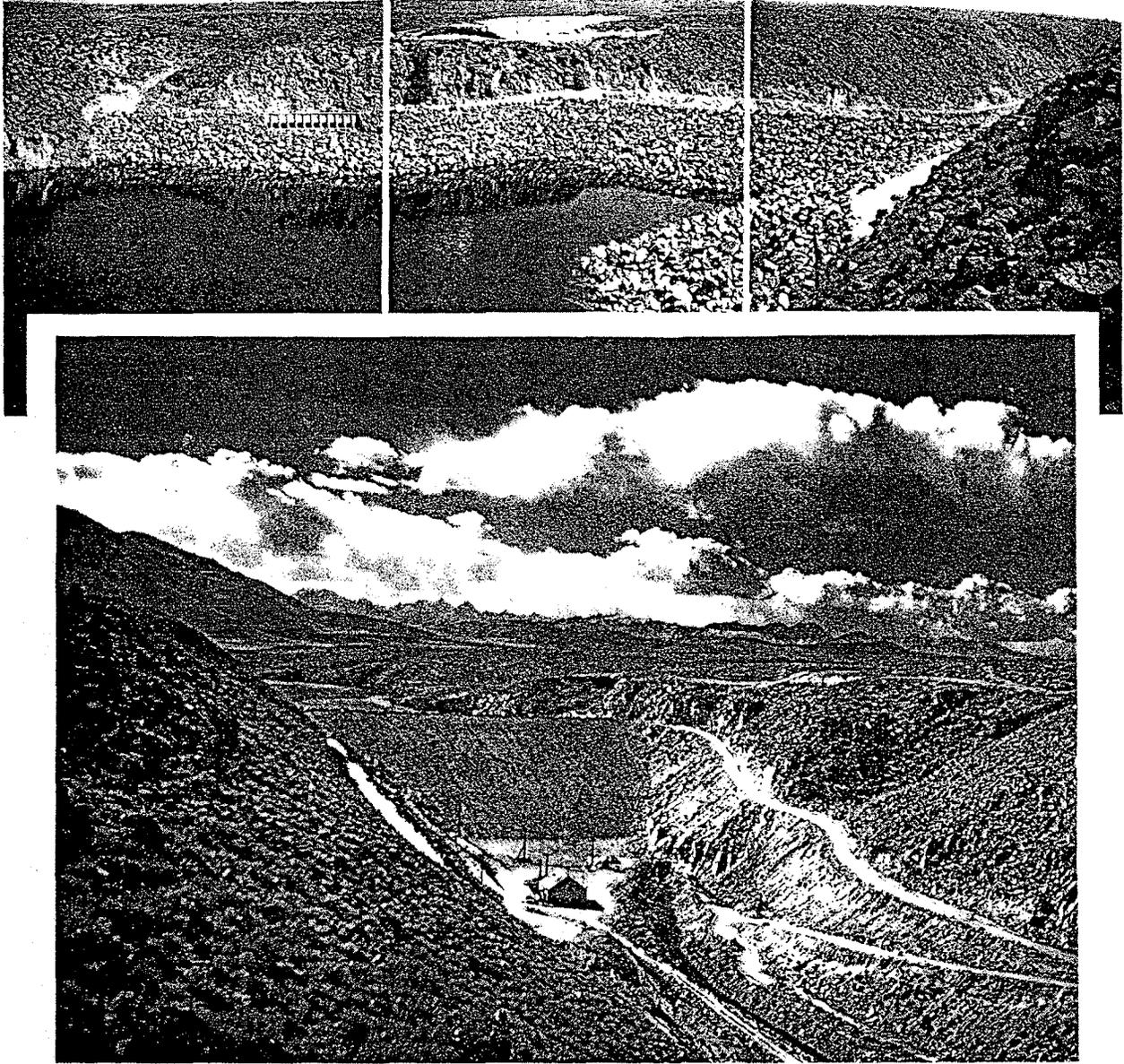
Engineering work done by this Division during the year ending June 30, 1941, consisted of the following:

Final lines and grades were established and construction stakes placed for the Grant Lake Dam and the Leevining Creek to Grant Lake Conduit. Inspection was furnished on construction work on the two projects. Concrete samples were taken and broken and soil tests carried on in conjunction with the rolled fill at Grant Lake.

Engineering supervision was furnished on the Grant Lake Dam, the Leevining Creek to Grant Lake Conduit, the replacement of portions of the Los Angeles Aqueduct siphons, the Rowena Reservoir Inlet-Outlet Lines and the extension of the Rowena-Ivanhoe 60" pipe line.

Daily and monthly progress of all construction work handled by the Division was taken and recorded.

The Division also carried on salvage work on Department owned materials, construction equipment and camp facilities in the Mono Basin.



*Long Valley Dam, shown in upstream (top) and downstream views, was nearing completion at the end of the fiscal year and had begun to store the waters forming Crowley Lake, largest municipal reservoir. Its capacity is 183,000 acre feet.*

nished at Upper and Lower San Fernando reservoirs and at Elysian dam to check all fill material as placed in the dikes and dams and to collect samples for laboratory testing. Test holes were drilled and logged along the route of the Rowena connecting line. Sieve analyses and specific gravity tests were conducted on concrete aggregate samples used on construction projects. A comparative test of concrete mixes was made using various waterproofing admixtures. Bentonite cement tests were conducted. Sugar solubility, alkalinity, free alkali, and centrifuge tests were conducted using samples of miscellaneous brands of cements. Concrete meter boxes, bronze, cast iron and brass samples were received, tested, and report of results submitted to Division