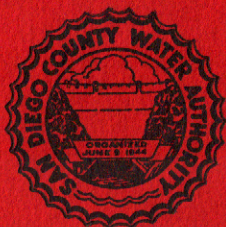


SAN DIEGO COUNTY WATER AUTHORITY



FOURTH ANNUAL REPORT

1950

SAN DIEGO COUNTY WATER AUTHORITY

FOURTH ANNUAL REPORT

For Period

July 1, 1949 to June 30, 1950

J. L. BURKHOLDER

GENERAL MANAGER AND CHIEF ENGINEER

SAN DIEGO, CALIFORNIA

1950



End of San Diego Aqueduct, showing water discharging into San Vicente Reservoir

LETTER OF TRANSMITTAL

San Diego, California

October 1, 1950

BOARD OF DIRECTORS

SAN DIEGO COUNTY WATER AUTHORITY

Gentlemen:

Transmitted herewith is the Fourth Annual Report of the San Diego County Water Authority for the fiscal year ending June 30, 1950.

The report covers the operation and maintenance of the Authority for the third year of delivery of Colorado River water to its member agencies, and the construction of additional facilities on the distribution system. Also included is a brief account of current activities of The Metropolitan Water District of Southern California, of which the Authority is a member.

Very truly yours,

J. L. BURKHOLDER,
General Manager and Chief Engineer.

ROSTER

DIRECTORS

July 1, 1949 to June 30, 1950

| | |
|--|----------------------|
| Chula Vista..... | Arthur L. Lynds |
| Fallbrook Public Utility District (to 7-11-49)..... | Emil J. Schmitz |
| | Franz R. Sachse |
| Lakeside Irrigation District..... | Allen G. Mitchell |
| La Mesa, Lemon Grove and Spring Valley Irrigation District..... | Marcel J. Shelton |
| National City..... | Delavan J. Dickson |
| Oceanside..... | Harold N. Beck |
| San Diego..... | Gerald E. Arnold |
| | J. William Fisher |
| | Fred A. Heilbron |
| | Arthur H. Marston |
| | Fred W. Simpson |
| | Raymond M. Wansley |
| | Walter B. Whitcomb |
| San Dieguito Irrigation District..... | Frank S. Jacobson |
| Santa Fe Irrigation District..... | D. Maitland Bakewell |

OFFICERS OF THE BOARD

| | |
|---------------------------------------|--------------------|
| Chairman..... | Fred A. Heilbron |
| Vice-Chairman..... | Arthur L. Lynds |
| Secretary..... | Delavan J. Dickson |
| Executive Secretary (to 8-22-49)..... | Eleanor Longfellow |
| | Dorothy D. Miller |

EXECUTIVE OFFICERS AND OPERATING STAFF

| | |
|--|---------------------|
| General Manager and Chief Engineer..... | J. L. Burkholder |
| General Counsel..... | W. H. Jennings |
| Assistant Chief Engineer..... | Richard S. Holmgren |
| Controller..... | Charles L. Royer |
| Treasurer (to 11-29-49)..... | Walter B. Whitcomb |
| | Harry L. Hall |
| Assistant Controller..... | Mary G. Unger |
| Superintendent, Maintenance and Operation..... | A. B. Gale |

BOARD OF DIRECTORS

June 30, 1950



Vice Chairman
Arthur L. Lynds
Chula Vista



Chairman
Fred A. Heilbron
San Diego



Secretary
Delavan J. Dickson
National City



Gerald E. Arnold
San Diego



D. Maitland Bakewell
Santa Fe
Irrigation District



Harold N. Beck
Oceanside



J. William Fisher
San Diego



Frank S. Jacobson
San Dieguito
Irrigation District



Arthur H. Marston
San Diego



Allen G. Mitchell
Lakeside Irrigation
District



Franz R. Sachse
Fallbrook Public
Utility District



Marcel J. Shelton
La Mesa, Lemon Grove and
Spring Valley Irrigation District



Fred W. Simpson
San Diego



Raymond M. Wansley
San Diego



Walter B. Whitcomb
San Diego

COMMITTEES OF THE BOARD

June 30, 1950

ENGINEERING AND OPERATIONS

Marcel J. Shelton, Chairman
Gerald E. Arnold
J. William Fisher
Frank S. Jacobson
Arthur H. Marston

FINANCE AND INSURANCE

Harold N. Beck, Chairman
Delavan J. Dickson
Arthur L. Lynds
Allen G. Mitchell
Raymond M. Wansley
Walter B. Whitcomb

LEGAL AND CLAIMS

Allen G. Mitchell, Chairman
Gerald E. Arnold
D. Maitland Bakewell
Delavan J. Dickson
Franz R. Sachse
Raymond M. Wansley

ORGANIZATIONS, PERSONNEL AND PUBLIC RELATIONS

Fred W. Simpson, Chairman
D. Maitland Bakewell
Harold N. Beck
Frank S. Jacobson
Walter B. Whitcomb

WATER PROBLEMS

Arthur H. Marston, Chairman
J. William Fisher
Fred A. Heilbron
Arthur L. Lynds
Franz R. Sachse
Marcel J. Shelton
Fred W. Simpson

ROLL OF DIRECTORS Since formation of Authority

CHULA VISTA

Arthur L. Lynds.....July 15, 1944 to Present

FALLBROOK PUBLIC UTILITY DISTRICT

Emil J. Schmitz.....July 15, 1944 to July 11, 1949
Franz R. Sachse.....July 14, 1949 to Present

LAKESIDE IRRIGATION DISTRICT

Allen G. Mitchell.....July 15, 1944 to Present

LA MESA, LEMON GROVE AND SPRING VALLEY IRRIGATION DISTRICT

William H. Jennings.....July 15, 1944 to February 12, 1948
Marcel J. Shelton.....February 12, 1948 to Present

NATIONAL CITY

George V. Johnson.....July 15, 1944 to July 15, 1947
Delavan J. Dickson.....August 14, 1947 to Present

OCEANSIDE

Harold N. Beck.....July 15, 1944 to Present

SAN DIEGO

Gerald E. Arnold.....July 29, 1948 to Present
J. William Fisher.....March 7, 1950 to Present
Fred A. Heilbron.....July 15, 1944 to Present
Arthur H. Marston.....July 15, 1944 to Present
Fred W. Simpson.....July 15, 1944 to Present
Raymond M. Wansley.....March 7, 1950 to Present
Walter B. Whitcomb.....July 15, 1944 to Present

SAN DIEGUITO IRRIGATION DISTRICT

Frank S. Jacobson.....December 22, 1948 to Present

SANTA FE IRRIGATION DISTRICT

D. Maitland Bakewell.....December 14, 1948 to Present

Directors From Agencies Which Have Withdrawn From the Authority

CORONADO

(withdrew from Authority May 10, 1946)

George F. Neal.....July 15, 1944 to May 10, 1946

RAMONA IRRIGATION DISTRICT

(withdrew from Authority August 21, 1946)

Albert C. Bisher.....July 15, 1944 to August 21, 1946

SAN DIEGO COUNTY WATER AUTHORITY

MEMBER AGENCIES AS OF JUNE 30, 1950

| <i>Member Agency</i> | <i>Date of Entry</i> |
|--|----------------------|
| City of Chula Vista..... | June 9, 1944 |
| Fallbrook Public Utility District..... | June 9, 1944 |
| Lakeside Irrigation District..... | June 9, 1944 |
| La Mesa, Lemon Grove and Spring Valley Irrigation District..... | June 9, 1944 |
| City of National City..... | June 9, 1944 |
| City of Oceanside..... | June 9, 1944 |
| City of San Diego..... | June 9, 1944 |
| San Dieguito Irrigation District..... | Dec. 13, 1948 |
| Santa Fe Irrigation District..... | Dec. 13, 1948 |

| <i>Agencies which have withdrawn their corporate area from the Authority</i> | <i>Period of Membership</i> |
|--|-------------------------------|
| City of Coronado..... | June 9, 1944 to May 10, 1946 |
| Ramona Irrigation District..... | June 9, 1944 to Aug. 21, 1946 |

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FOREWORD

DURING the fiscal year ending June 30, 1950, San Diego County experienced a continuation of the notable growth in commerce and industry, evidenced throughout the past decade. Construction of new buildings continued at a rapid pace. This growth, together with the drought now in its fifth consecutive year, accentuates the need for importing water to satisfy the increasing demands for military, industrial, and domestic uses in this semi-arid region. It would have been impossible to have met such demands if the first unit of the San Diego Aqueduct had not been previously placed in operation.

Economic Growth of San Diego County

Reports released by the San Diego Chamber of Commerce show that economic conditions in San Diego County have improved during the past calendar year. Income from agricultural production increased from \$57,671,000 in the previous year to \$62,391,000. Income from tourists visiting the area increased from \$45,000,000 in the previous year to \$54,000,000. Industrial payrolls increased from \$66,356,000 in the previous year to \$78,700,000, while the valuation of products produced at 445 manufacturing plants increased from \$173,000,000 in the previous year to \$253,000,000. Navy payrolls totaled \$97,663,000, only a slight increase above the previous year.

The number of building permits issued in San Diego County during the 1949 calendar year increased from 6808 in the previous year to 9988; however, the total valuation of the permits was only \$22,000,000, a decrease of about \$2,500,000 for the period. Substantiating the belief that the current building activity primarily involves the construction of small homes, is the fact that new installations of electric, gas, and water meters exceeded the number of installations made in any previous year.

Growth in Population

The population of San Diego County and the eight incorporated cities therein, as determined by the 1950 census, was made available in preliminary form late in the fiscal year. The 1950 population figures, though somewhat less than anticipated, were remarkable when compared with the 1940 figures. The total population of San Diego

County is 535,967, of which an estimated 434,777 reside within the corporate area of the Authority.

The population of the county, and the estimated population within the Authority area, are shown in Table 1.

TABLE 1
POPULATION—COUNTY AND AUTHORITY AREAS—1910 to 1950
Includes Civilian and Military

| Year (as of April 1) | COUNTY | | AUTHORITY | | Per cent of County population in Authority |
|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|---|
| | Total population (1) | Average annual growth | Total population (2) | Average annual growth | |
| 1910 | 61,665 | | 46,000 | | 74 |
| 1920 | 112,248 | 5,058 | 87,000 | 4,100 | 78 |
| 1930 | 209,659 | 9,741 | 173,000 | 8,600 | 82 |
| 1940 | 289,348 | 7,969 | 248,274 | 7,600 | 86 |
| 1946 (3) | 502,804 | 24,662 | (3) 440,659 | 18,650 | 88 |
| 1950 (4) | 535,967 | | 434,777 | | 81 |

- (1) County population from U.S. Census Bureau Reports.
- (2) Authority population based on U.S. Census Bureau Reports. Population in years prior to Authority organization in 1944 are for Authority area as of 1944. Population in later years is for Authority as then constituted.
- (3) Based on Special Census, U.S. Census Bureau, exclusive of emergency Military personnel due to World War II.
- (4) Preliminary figures from 1950 by U.S. Census Bureau.

The population of the constituent areas of the San Diego County Water Authority, together with the density of population in each area, is shown in Table 2. The table shows that there has been an average population increase during the past decade of about 75 per cent within the constituent areas of the Authority. While increases occurred in all areas, the largest rate of gain, 268 per cent, occurred in the city of El Cajon, and the smallest rate of gain, 50 per cent, occurred in the Santa Fe Irrigation District.

Table 2 shows a wide variation in density of population of the nine Authority areas, ranging from a low of 0.30 persons per acre in the Santa Fe Irrigation District to a high of 6.66 persons per acre in the city of El Cajon.

TABLE 2
POPULATION—AUTHORITY CONSTITUENT AREAS AND COUNTY
(Includes Civilian and Military)

| Constituent Areas | Gross Area 6/30/50 | Population—U. S. Census | | Increase | Per Cent | Density of Population 1950 | |
|--|--------------------------|-------------------------|---------------------------|----------|----------|----------------------------------|-----------------|
| | | 1940 (1) | 1950 (2) (Preliminary) | | | Per Acres | Per Sq. Mile |
| Chula Vista | 3,363 | 5,138 | 15,844 | 208 | 4.71 | 3,015 | |
| Fallbrook Public Utility District | 5,000 | 2,300 | 5,500 | 139 | 1.10 | 704 | |
| Lakeside Irrigation District | 1,560 | (4) 1,000 | 1,800 | 80 | 1.15 | 738 | |
| La Mesa, Lemon Grove & Spring Valley Irrigation District: | | | | | | | |
| In City of El Cajon | 813 | 1,471 | 5,418 | 268 | 6.66 | 4,265 | |
| In City of La Mesa | 1,900 | 3,925 | 10,908 | 178 | 5.74 | 3,674 | |
| In Crest Public Utility District | 386 | | 928 | | 2.40 | 1,539 | |
| In unincorporated areas | 16,058 | 11,704 | 29,610 | 153 | 1.84 | 1,180 | |
| Total | 19,157 | 17,100 | 46,864 | 174 | 2.45 | 1,566 | |
| National City | 3,464 | 10,344 | 21,132 | 104 | 6.10 | 3,904 | |
| Oceanside | 6,402 | 4,651 | 12,880 | 177 | 2.01 | 1,288 | |
| San Diego | 66,141 | 203,341 | 321,485 | 58 | 4.86 | 3,111 | |
| San Diego Irrigation District | 4,020 | (4) 2,400 | 6,272 | 161 | 1.56 | 999 | |
| Santa Fe Irrigation District | 10,106 | (4) 2,000 | 3,000 | 50 | .30 | 190 | |
| Total Authority Area | 119,213 | 248,274 | 434,777 | 75 | 3.65 | 2,334 | |
| San Diego County | 2,725,100 | 289,348 | 535,967 | 85 | .20 | 126 | |

- (1) Population in agencies other than cities was estimated from population of judicial townships.
- (2) Population in agencies other than cities was furnished by agencies.
- (3) Does not include areas which are a part of the City but not of the Authority.
- (4) Estimated.

Assessed Valuation

Continuing the steady increase of recent years, the assessed valuation of taxable property within San Diego County reached an all-time high of \$469,759,905 at the end of the fiscal year, an increase of \$34,759,685 over the valuation of the previous year.

For the fiscal year 1949-50 the assessed valuation of taxable property within the constituent areas of the Authority was \$378,524,215, about 81 per cent of the total valuation of the entire county. The assessed valuation of each constituent area, together with the increase over the previous year, and the annual percentage increases in valuation, are shown in Table 3. The increase in assessed valuation of the Authority area was 9.1 per cent, about 1 per cent greater than that of the entire county. Four areas, the Fallbrook Public Utility District, the La Mesa, Lemon Grove and Spring Valley Irrigation District, and the cities of National City and Chula Vista, showed rates of increase in valuation in excess of 10 per cent of the valuations for the previous year. The largest area, that of the City of San Diego, had a 7.6 per cent rate of increase for the period.

TABLE 3
ASSESSSED VALUATIONS—AUTHORITY CONSTITUENT AREAS AND COUNTY

| Agency | Area | Assessed Valuations Secured and Unsecured | | Increase | Per cent | Assessed Valuation 1949-50 | Per acre |
|--|----------------------|---|----------------------|----------|------------|----------------------------|----------|
| | | 1948-49 | 1949-50 | | | | |
| Chula Vista | Acres | | | | | | |
| | 3,363 | \$ 10,901,560 | \$ 12,735,200 | | 16.8 | \$3,787 | |
| Fallbrook Public Utility District | 5,000 | 2,274,700 | 2,532,730 | | 11.3 | 507 | |
| Lakeside Irrigation District | 1,560 | 626,800 | 677,990 | | 8.2 | 435 | |
| La Mesa, Lemon Grove and Spring Valley Irrigation District | (2) 19,157 | 26,834,740 | 31,985,530 | | 19.2 | 1,670 | |
| National City | 3,464 | 9,175,530 | 9,749,585 | | 6.3 | 2,815 | |
| Oceanside | 6,402 | 7,763,870 | 9,283,590 | | 19.6 | 1,450 | |
| San Diego | 66,141 | 281,309,690 | 302,764,970 | | 7.6 | 4,578 | |
| San Dieguito Irrigation District | (2) 4,020 | 4,536,630 | 4,975,240 | | 9.7 | 1,238 | |
| Santa Fe Irrigation District | 10,106 | 3,671,320 | 3,819,380 | | 4.0 | 378 | |
| Total Authority Area | 119,213 | \$347,094,840 | \$378,524,215 | | 9.1 | \$3,175 | |
| San Diego County | 1,250,048 (1) | \$435,000,220 | \$469,759,905 | | 8.0 | \$ 376 | |

(1) Excluding 1,475,052 acres of tax-exempt lands in San Diego County as of October 30, 1949.

(2) Includes area excluded from Agency but not from Authority.

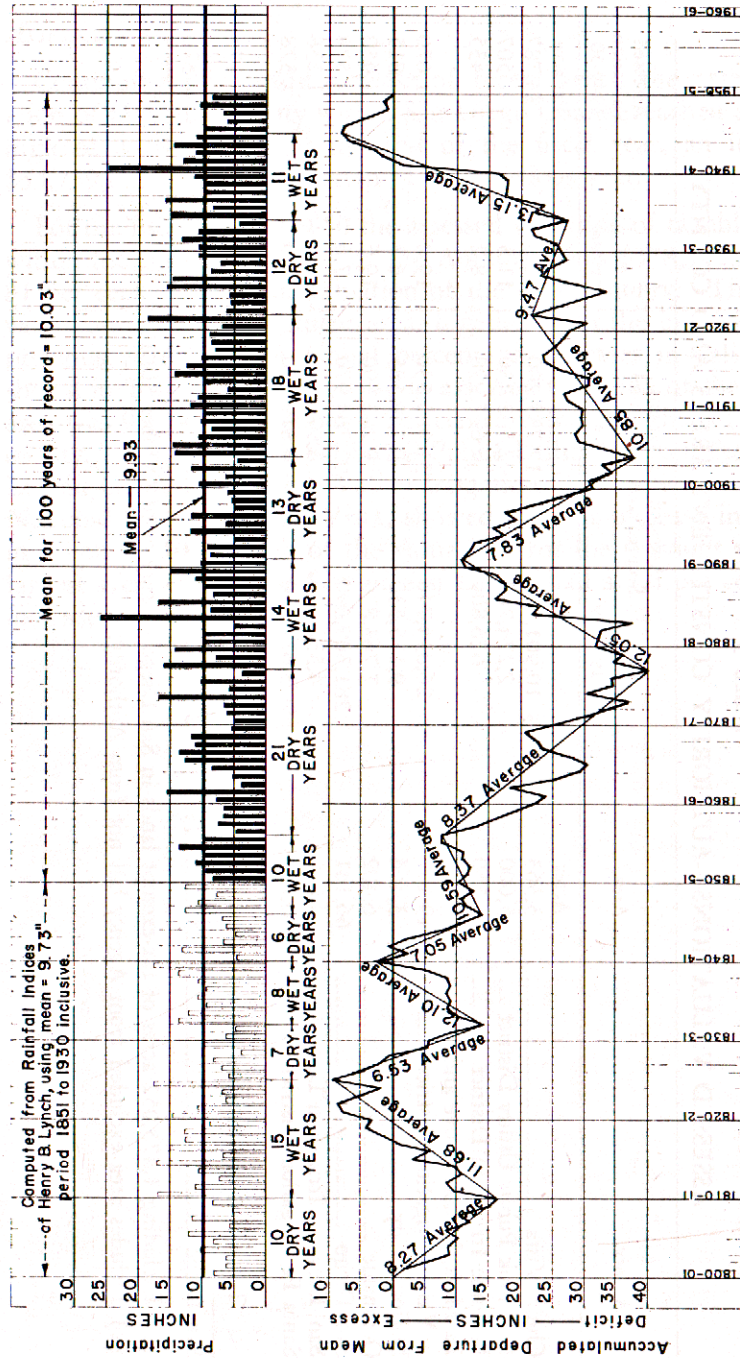


Figure 1. Rainfall Record at San Diego, California.

Use of Colorado River Water

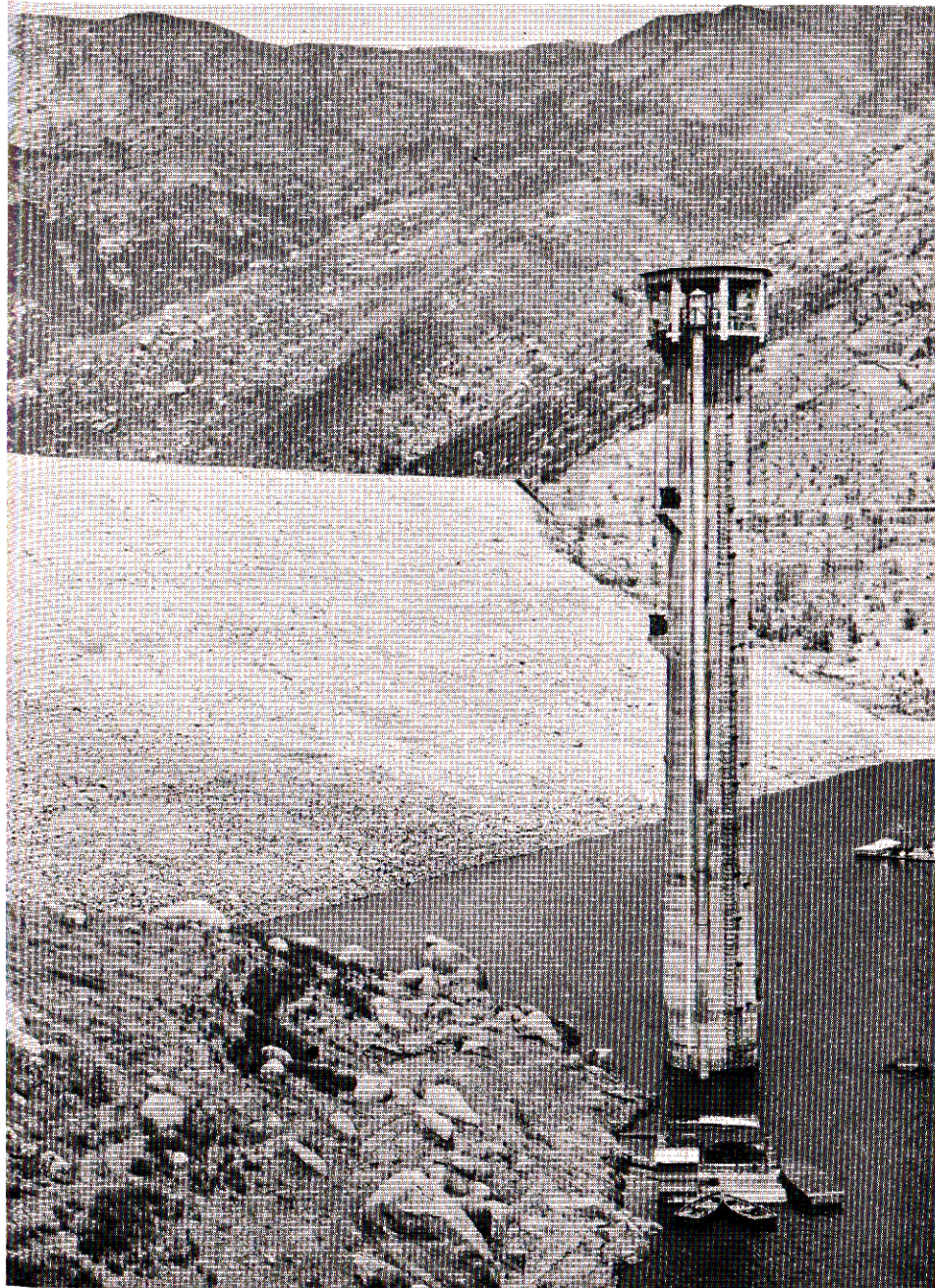
The San Diego Aqueduct operated continuously at full capacity during the period July 1, 1949 to June 30, 1950, delivering 69,264 acre-feet of Colorado River water to areas in San Diego County entitled to receive water from the Aqueduct. This quantity of water was 2,306 acre-feet less than the 71,570 acre-feet delivered to member agencies in the previous year.

During the fiscal year, Colorado River water was used by all the agencies served by the Authority. The amounts of such water delivered to consumers as compared with the total users, varied from a maximum of 86 per cent in Chula Vista and National City, to a minimum of 4 per cent in the city of Oceanside. The areas served by the San Diego County Water Authority consumed a total of 90,160 acre-feet, of which 56,072 acre-feet, or 62 per cent, was Colorado River water.

The current drought remained unbroken during the fiscal year. There were only 8.55 inches of rainfall at San Diego during the period, a deficiency of about 17 per cent. Figure 1 shows the rainfall record at San Diego for the period from 1800 to 1950, together with the accumulated departure from mean rainfall and the wet and dry cycles.

There was no measured runoff from drainage basins into the surface reservoirs serving Authority agencies. The water needs of these agencies have been met by Colorado River water, supplemented by water taken from reserve supplies in surface and underground reservoirs. Because of the lack of runoff, the quantity of water in surface reservoirs was reduced during the period by 19,683 acre-feet, leaving only 94,967 acre-feet remaining at the end of the fiscal year as reserves for future needs. Of the total storage capacity in existing surface reservoirs, 465,389 acre-feet, only 20 per cent was filled with water at the end of the fiscal year.

The continued reduction in water reserves has created a hazardous situation in the water supply of the Authority area which could become critical if the drought continues more than another year, or if the water demands should increase abnormally due to mobilization. The Korean incident has increased industrial activity in the area and brought in additional personnel. To guard against the possibility of a drastic water shortage, the Authority has taken preliminary steps toward completing the San Diego Aqueduct by the construction of the second barrel. A contract has been entered into between the



El Capitan Dam—typical of low water levels in San Diego County Reservoirs

Authority and the U. S. Bureau of Reclamation providing for an engineering report on the proposed project. The report is scheduled to be completed before the end of the current calendar year. It is believed that this report will provide a basis for requesting the Federal Government to authorize the construction of the necessary works, subject to the terms of a contract to be entered into with the Authority providing for reimbursement of the cost thereof.

CHRONOLOGY OF PERTINENT EVENTS

- 10-23-23 Preliminary studies of Colorado River as a source of additional water supply were begun by City of Los Angeles.
- 9-17-24 Colorado River Aqueduct Association organized at Pasadena, California.
- 6- 2-25 City of Los Angeles issued \$2,000,000 Colorado River project bonds for preliminary surveys and investigations.
- 4-15-26 City of San Diego filed application with the Division of Water Resources of the State of California for a permit to divert 155 c.f.s. from the Colorado River annually.
- 7-29-27 Metropolitan Water District Act enacted by California Legislature permitting noncontiguous cities and districts to co-operate in acquisition of domestic water supplies.
- 12- 6-28 The Metropolitan Water District of Southern California organized with eleven member cities.
- 4-24-30 Metropolitan Water District contracted with the United States for storage of water and for 36 per cent of the power generated at Hoover Dam.
- 8-18-31 Seven Party Water Agreement of 1930 signed by representatives of Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego and County of San Diego fixing the priorities of the respective water rights in the Colorado River.
- 9-29-31 A construction bond issue of \$220,000,000 was approved by Metropolitan Water District electors.
- 1-25-33 Construction work on Colorado River Aqueduct was started on Coachella Tunnel at Fargo Adit.

- 2-15-33 Contract executed between Secretary of the Interior and The City of San Diego providing for 250,000 acre-feet of storage capacity in Boulder Reservoir, and for the delivery of 112,000 acre-feet of water to San Diego City and/or County each year at a point in the Colorado River immediately above Imperial Dam.
- 10- 2-34 Contract executed between Secretary of the Interior and The City of San Diego, providing for construction of capacity in All-American Canal Project for the diversion and carriage of 155 c.f.s. allotment of Colorado River water to The City and/or County of San Diego.
- 8-31-41 Initial stage of Colorado River Aqueduct construction completed and water system placed in operating status.
- 5-17-43 County Water Authority Act as introduced in the California legislature by Senator Ed Fletcher approved by the Governor of California and filed with the Secretary of State.
- 6- 9-44 The San Diego County Water Authority organized, consisting of nine public agencies.
- 11-29-44 The President of the United States transmits a communication to the Senate approving the Report of the Committee on San Diego Water Problems, and advising that he has directed immediate construction by the Federal Government of an aqueduct connecting the Colorado River Aqueduct of The Metropolitan Water District with the water system of San Diego at its San Vicente Reservoir.
- 5-18-45 First contract on San Diego Aqueduct awarded by U. S. Navy for construction of Poway, Fire Hill, and San Vicente tunnels.
- 10-17-45 Contract executed between the U. S. Navy, acting for the Government, and The City of San Diego providing for the continuation of construction of the San Diego Aqueduct and lease of Aqueduct to The City of San Diego, with privilege of later transferring to the Authority.
- 5-10-46 The withdrawal of The City of Coronado from the Authority officially completed by filing of proceedings by Secretary of Authority in the office of the Secretary of State.
- 6-28-46 Board adopted Resolution No. 17, declaring intention to

- call an election to authorize incurring of bonded indebtedness of \$2,000,000 to construct distribution lines.
- 8-15-46 Proposed contract merging water rights of City of San Diego with those of the Metropolitan Water District approved by the Authority, and the General Manager and Chief Engineer authorized to execute same on behalf of Authority.
- 8-21-46 Withdrawal of Ramona Irrigation District from the Authority officially completed by filing of proceedings with Secretary of State.
- 9-23-46 Supplemental Agreement No. 1 covering assignment of City-Navy Lease Contract NOy-13300 to San Diego County Water Authority formally executed by parties thereto.
- 11- 5-46 The Authority electors approved three propositions relative to proposed importation of Colorado River water: (1) annexation of corporate area of Authority to the Metropolitan Water District; (2) Supplemental Contract No. 1 transferring most of provisions of Aqueduct Lease-Purchase Contract from City to Authority; (3) incurring bonded indebtedness of \$2,000,000 for construction of branch lines. City of San Diego electors also approve Proposition No. 2.
- 12-17-46 The corporate area of the San Diego County Water Authority officially became annexed to The Metropolitan Water District of Southern California.
- 12-20-46 Authority sold its \$2,000,000 bond issue for branch lines to syndicate headed by Bank of America National Trust and Savings Association.
- 1-27-47 Comptroller-General reports to the Congress questioning legality of expenditures on Aqueduct.
- 5- 1-47 Committee on Expenditures in Executive Departments renders report to Congress recommending completion of Aqueduct.
- 7- 2-47 Contract for construction of La Mesa-Sweetwater Extension awarded by the Board of Directors of the Authority to American Pipe and Construction Company.
- 8-28-47 Contract for Easterly Section of Fallbrook-Oceanside Branch

awarded by Board of Directors of the Authority to Edward Green.

- 11-13-47 Contract for Westerly Section of Fallbrook - Oceanside Branch awarded by Board of Directors of the Authority to American Pipe and Construction Company.
- 11-24-47 Initial flow of Colorado River water passed through San Diego Aqueduct and discharged into San Vicente Reservoir.
- 12-11-47 Water Authority took possession of San Diego Aqueduct for operation and maintenance on terms of informal interim agreement pending completion of the construction. The interim agreement was later replaced by Supplemental Agreement No. 3 to the Aqueduct Lease-Purchase Contract.
- 12-13-48 Corporate areas of the San Dieguito Irrigation District and the Santa Fe Irrigation District annexed to the Authority and The Metropolitan Water District of Southern California.
- 4-15-48 An Act of Congress (Public Law 482-80th Congress) was approved ratifying the actions of the executive branch of the Federal Government in proceeding with the construction of the San Diego Aqueduct.
- 4-25-49 Contract executed between the U. S. Bureau of Reclamation and the Authority relating to the investigation by the Bureau of the Second Barrel of the San Diego Aqueduct.
- 2-17-50 Contract executed between the City of San Diego and the Authority for the use of storage capacity by the Authority in San Vicente Reservoir.

SECTION I

OPERATION AND MAINTENANCE

CONSTRUCTION of the first barrel of the San Diego Aqueduct by the U. S. Navy was usably completed in late November, 1947. At that time the Authority took over the operation and maintenance of the southerly one-half of the Aqueduct, and the Metropolitan Water District assumed responsibility for the operation and maintenance of the northerly one-half of the line.

During the year, the District and the Authority continued to operate the Aqueduct under the terms of Supplemental Agreement No. 3 of the Navy-Authority Lease-Purchase Contract NOy-13300, pending the determination of the true cost of the project. The cost of the Aqueduct cannot be determined until all the rights of way have been acquired. The Department of Justice is still negotiating with the owners of a few parcels of land on which the works are situated. Also, one of the contractors has a claim for additional compensation for constructing tunnels and has not accepted the terms for final settlement as proposed by the Navy Department.

Authority-Operated Distribution System

Prior to April 15, 1948, the southerly one-half of the Aqueduct, about 35 miles in length, was the only works operated and maintained by the Authority. At that time the construction of the La Mesa-Sweetwater Extension and the easterly portion of the Fallbrook-Oceanside line was completed and placed in operation. The construction of the westerly portion of the Fallbrook-Oceanside Branch was completed on May 13, 1948 and placed on an operation status. The completion of the branch lines added 33 miles of conduit to the Authority-operated water system, which is shown on map, Figure 2. The principal features of this system are shown in Table 4.

The distribution system operated by the Authority, excepting that portion serving the city of Oceanside, was in continuous operation throughout the fiscal year. A total of 69,264 acre-feet of water was delivered at an average rate of flow of 95.7 c.f.s. During the year 10,652 acre-feet was placed in storage in San Vicente Reservoir for the account of member agencies other than the City of San Diego. This was accomplished by an agreement between the Authority and

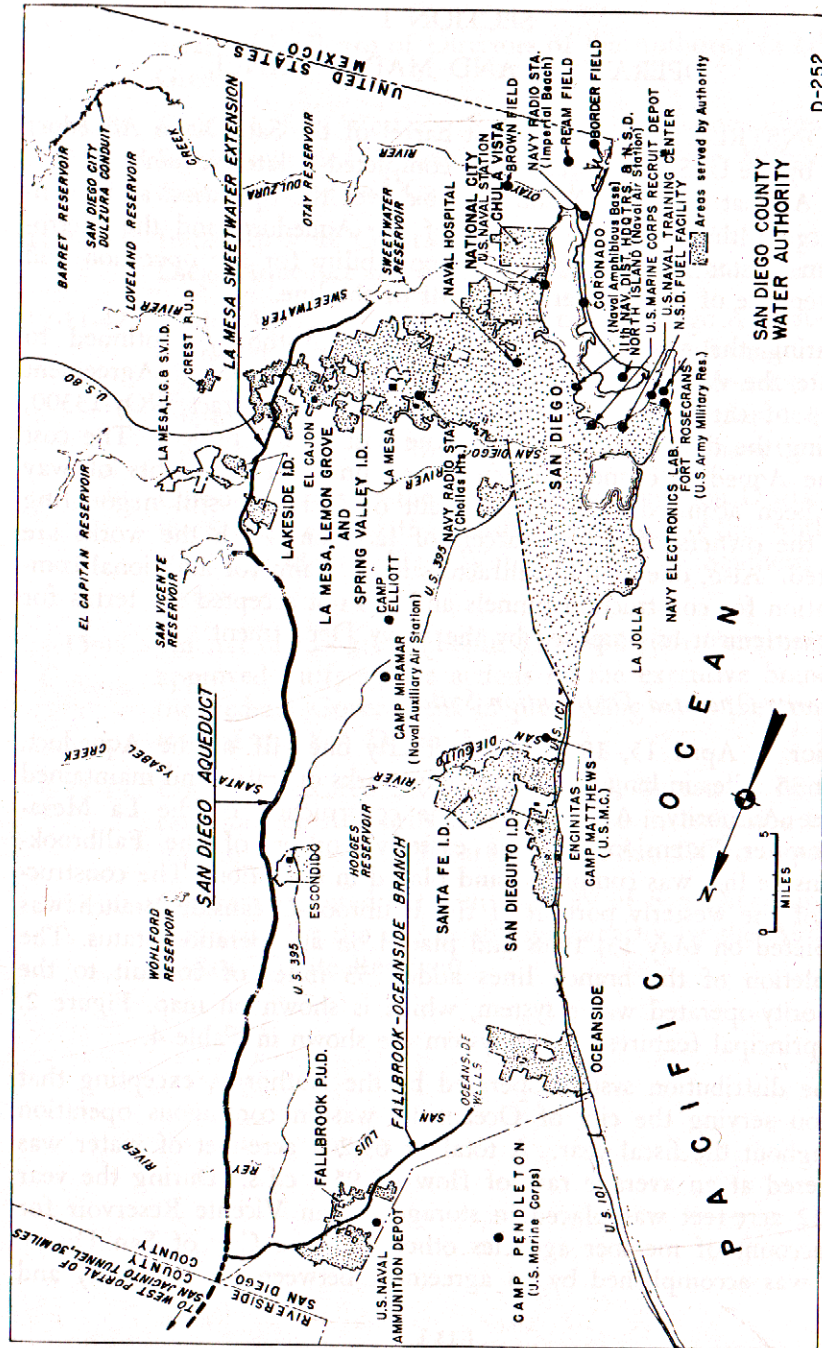


Figure 2. Areas in San Diego County served by the San Diego County Water Authority through the Aqueduct and its branches.

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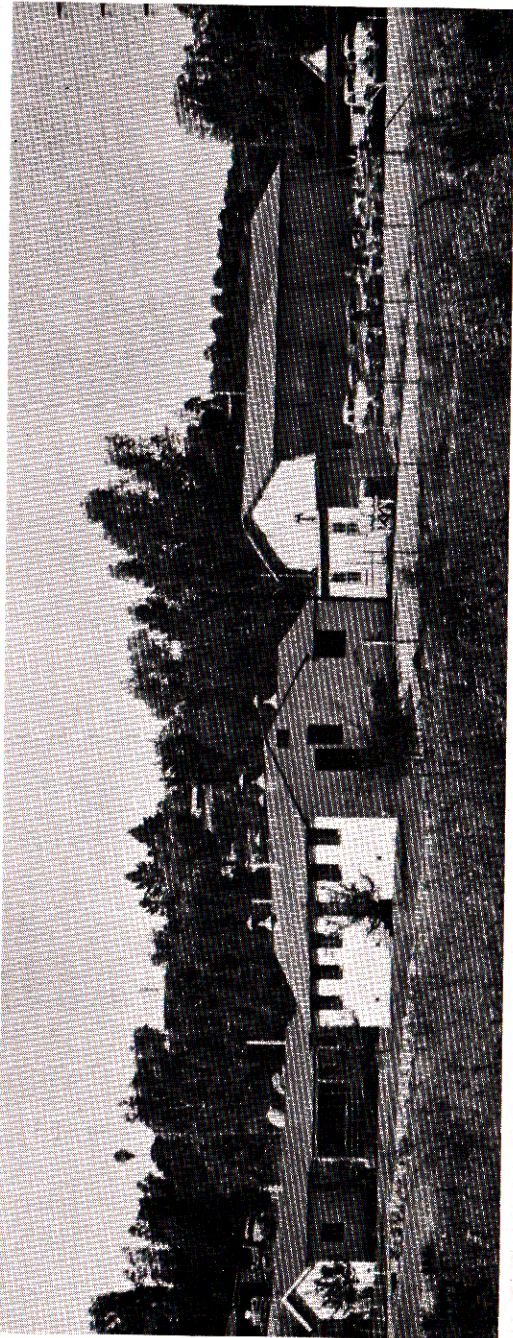
the City of San Diego under which the Authority acquired the right to use storage capacity up to 20,000 acre-feet for the benefit of its agencies.

TABLE 4
PRINCIPAL FEATURES OF AQUEDUCT SYSTEM

| SAN DIEGO AQUEDUCT (portion operated by Authority) | | | |
|--|-----------|--------------|--------------------|
| Tunnels | 72" diam. | 18,333 | feet |
| Concrete Pipe | 72" " | 8,612 | " |
| Concrete Pipe | 54" " | 24,680 | " |
| Concrete Pipe | 48" " | 122,564 | " |
| Steel Pipe | 48" " | 9,250 | " |
| Total Length | | 183,439 | feet = 34.74 miles |
| Vent Structures | | 14 | |
| Metering Stations | | 1 | |
| Access Vaults (air valves, blow-offs, manholes) | | 70 | |
| LA MESA-SWEETWATER EXTENSION | | | |
| Concrete Pipe | 48" diam. | 64.0 | feet |
| Concrete Pipe | 42" " | 3,854.8 | " |
| Concrete Pipe | 39" " | 20,900.3 | " |
| Concrete Pipe | 27" " | 17,921.2 | " |
| Concrete Pipe | 24" " | 35,734.1 | " |
| Concrete Pipe | 18" " | 8,704.2 | " |
| Total Length | | 87,178.6 | feet = 16.51 miles |
| Access Vaults (air valves, blow-offs) | | 35 | |
| Metering Stations | | 1 | |
| FALLBROOK-OCEANSIDE BRANCH | | | |
| Steel Pipe | 16" diam. | 31,972.9 | feet |
| Concrete Pipe | 14" " | 53,756.4 | " |
| Total Length | | 85,729.3 | feet = 16.24 miles |
| Access Vaults (air valves & blow-offs) | | 45 | |
| Metering Stations | | 2 | |
| Open Vents | | 2 | |
| TOTAL LENGTH OF AQUEDUCT AND BRANCHES | | 67.49 | miles |

Operating Personnel

Operation and maintenance procedures, as developed from past experience, have now become fairly well standardized. Operation and maintenance activities during the year continued to be carried on from



Authority Maintenance Headquarters at Escondido

the Authority maintenance headquarters at Escondido, located centrally on the San Diego Aqueduct and its branches. The personnel working out of Escondido headquarters accomplishes all the work required to keep the system, consisting of a 68-mile length of pipe line, tunnels and other structures, in good operating condition, and other work incident to the delivery of water at eight widely separated delivery points. This seven-man force also accomplishes necessary small construction jobs such as the building of patrol roads and the installation of new metering stations. Except for the two men regularly employed on patrol duties, the other members of the force perform any type of work that needs to be done to maintain the proper functioning of the system.

Maintenance of Mechanical Equipment

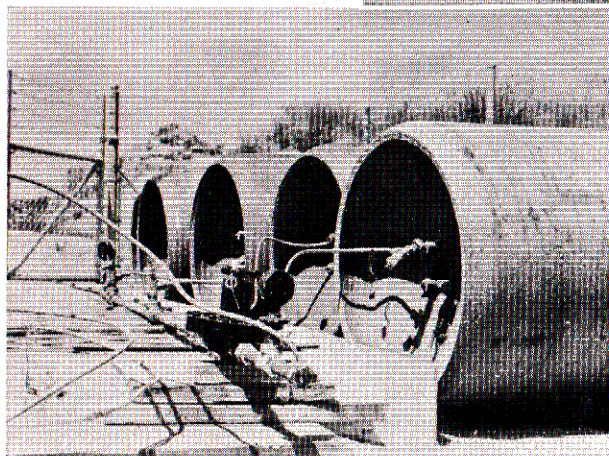
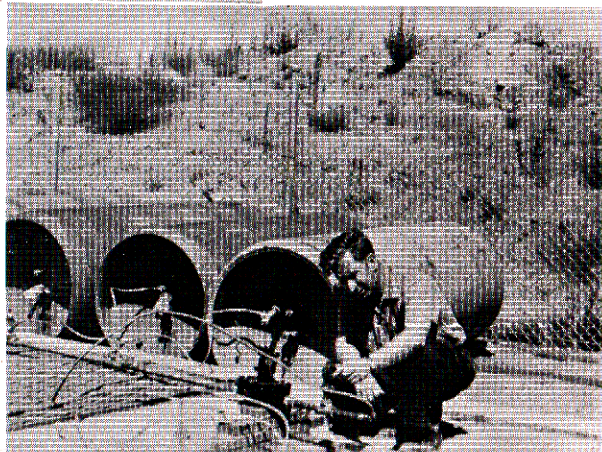
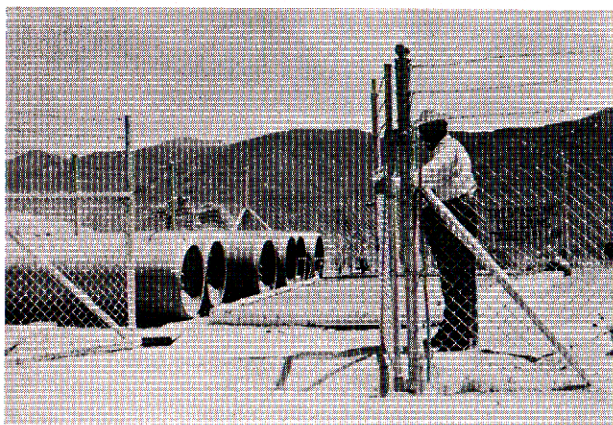
A vital part of the operation and maintenance work is the upkeep of the mechanical equipment such as valves, control gates and meters located on the 68-mile length of conduit comprising the Authority-operated system.

Full capacity operation of the water system depends on the constant functioning of this mechanical equipment. A repair shop, with qualified mechanical personnel in charge, is operated at the Escondido headquarters for the purpose of servicing and repairing the mechanical equipment located on the distribution system, as well as the mobile equipment. The mobile equipment includes the heavy equipment used primarily for construction and repair work, and the light trucks and jeeps used for patrol and miscellaneous purposes, a total of 16 units. This equipment is regularly based at the headquarters where it is repaired, serviced and sheltered when not in service.

Patrol of Aqueduct and Branch Lines

The distribution system has been continuously patrolled throughout the year on regular schedules which provide for daily trips over the Aqueduct section, with its numerous vent structures, and weekly trips over the branch lines where few open structures exist. The patrol work required about fifty thousand miles of travel during the year and was performed generally by two men with jeeps.

The elevation of the water surface in the open structures of the Aqueduct section was observed daily, and measurements of water levels were taken and recorded weekly. In this manner significant



Temporary chlorinating installation on Aqueduct

changes in water levels, indicating a decrease in carrying capacity of the pipe lines, are quickly reported so that the flow can be decreased in time to prevent overflow at the open structures.

Changes in the amounts of water being delivered to member agencies are usually made by patrolmen in the course of their regular inspection trips. The patrolmen change the record charts on metering instruments each week and take readings of the totalizers three times each month. Such readings determine the quantities of water sold to the agencies during a given month and provide data required by them to determine the amounts of Colorado River water delivered to their reservoirs.

Chlorination for Control of Bacterial Growth

Past experiences with the 71-mile Authority Aqueduct system has demonstrated that a reduction in pipe capacity occurs coincident with the increase in water temperatures during the summer months, and that this reduction in capacity is caused by a bacterial growth on the inside wall of the pipe. First evidenced by a rise in water level in the Aqueduct structures, the reduced capacity will later result in overflow of these structures unless the flow is reduced, or the growth is killed by injecting chlorine into the flowing water.

On July 17, 1949, with a flow of 98.0 c.f.s. at the Oat Hill Tunnel, the vent structure at the south portal overflowed, resulting in a wash-out of the earth-fill at the side of the structure. No damage occurred to the structure or pipe line. However, work with a bulldozer and crew was required to replace the washed-out material. Pending repairs, the Aqueduct flow at the outlet of San Jacinto Reservoir was reduced to provide a flow of 89 c.f.s. at the structure. On July 20, 1949, another rise in water level occurred, and an overflow was narrowly prevented by again reducing the flow.

In order to restore the normal capacity of the Authority section of the Aqueduct, chlorine was introduced into the water at the outlet of Red Mountain Tunnel on July 26, 1949. This point was selected because of its accessibility for trucking in the heavy tanks of chlorine. The equipment needed for injecting the chlorine into the flowing water was borrowed from the Metropolitan Water District and the installation was made with the assistance of District personnel. Chlorination was continued for a period of about ten days and was dis-

continued on August 5, 1949. The total quantity of chlorine used was 8000 pounds.

The Metropolitan Water District had been chlorinating periodically at the outlet of the San Jacinto Reservoir since the summer of 1948, for the purpose of controlling the bacterial growth which first appeared in the section of the Aqueduct being operated by the District. The later appearance of such growth in the southerly portion of the line showed that chlorination at San Jacinto would only control the growth in the northerly section of the line and that additional chlorination would be necessary at some point on the Aqueduct below the Fallbrook-Oceanside Branch.

The injection of chlorine at the outlet of the Red Mountain Tunnel in July 1949 proved entirely effective. Tests showed that chlorine residuals of at least 1.0 ppm at Oat Hill Tunnel and 0.5 ppm at the Lakeside Control Station were maintained during the operation. Algae growths in the open structures were also killed, and the line was restored to approximately its previous capacity before the operation was discontinued. During the operation a recording gauge was maintained near the head of the ten-mile siphon crossing the Escondido Valley. The record obtained indicated that there was a gain in head of 25 feet during the chlorination period.

The July chlorination was effective until late in September when a sudden rise in the water level at the south portal of Oat Hill Tunnel indicated that the bacterial growth was again reducing the capacity of the line. It then became necessary to reduce the discharge from San Jacinto Reservoir into the Aqueduct from 95 c.f.s. to 90 c.f.s., in order to prevent overflow. On September 30, 1949, the Metropolitan Water District increased the amount of chlorine being injected into the aqueduct flow at San Jacinto to 1000 pounds per day. This resulted in improved flow conditions at the south portal of Oat Hill Tunnel. By October 3, 1949, the drop in water level was sufficient to permit an increase in the flow to 92 c.f.s. However, it was not until October 21, 1949, that a flow of 95 c.f.s. could be re-established.

It appears that the temperature of the aqueduct flow has a great influence on the bacterial growth which has periodically reduced the line capacity during the summer months. During the period from July 17, 1949 to October 21, 1949 temperatures of the aqueduct flow dropped from a maximum of 82° F to 66° F.

Improvement in Rate of Water Deliveries to Fallbrook Public Utility District

A more uniform rate of water delivery to the Fallbrook Public Utility District system was achieved when the District's Red Mountain Reservoir was placed in service in August, 1949. At that time deliveries to this reservoir were made possible by the newly constructed Red Mountain Control Station and the extreme fluctuations which previously had occurred when water was being taken directly into the Fallbrook distributing system were greatly reduced. This likewise reduced fluctuations in the flow in the main Aqueduct below the Fallbrook takeoff and improved the operation of that portion of the system.

Maintenance of Access and Patrol Roads

Subsequent to assuming the operation of the southerly portion of the Aqueduct and the Authority-constructed branch lines, it was necessary to improve 37 miles of access and patrol roads. These roads are now completed and are being maintained by Authority crews and equipment for the purpose of facilitating the patrol and inspection work.

No serious washouts occurred except in a portion of the patrol road along the Fallbrook-Oceanside Branch, at a point about 2 miles above the Oceanside wells. Here a washout occurred, and it was necessary to install a 30-inch corrugated steel culvert to take future flows and to replace the washed-out fill above the pipe line. Additional smaller culverts were placed at other points on the access and patrol roads, in preparation for expected rains during the coming wet season. At several points sand from construction roads no longer in service had been carried by rain onto adjacent fields, resulting in some crop damage at several points along the Aqueduct. This situation has been remedied by the construction of ditches designed to divert the runoff into adjacent water courses.

At other points on the system, settlement of back-fill over the pipe lines has occurred, requiring the trucking in of additional material to restore the original ground surface. While several such restorations of fill have been necessary during the year, the points of settlement are now decreasing.

Maintenance of Valves and Metering Equipment

Some difficulty has been experienced with air valves located in vaults beneath paved streets, due to sand filtering through the air vents in the manhole covers and lodging on the seats of the air valves. This prevented tight closure of the valves and has resulted in flooding of the vaults, and occasionally the flooding of public roads. Such difficulties have now been corrected by the installation of elbows on the valve openings, which has prevented the entrance of sand. Eight valve installations were modified in this manner during the year.

The control piping on the Clayton pressure-reducing valve at the Hodges Control Station broke on several occasions due to excess vibration necessitating the complete shutdown of the station pending repairs. This station operates under an initial water pressure of about 230 pounds per square inch. After several unsuccessful attempts to prevent this difficulty, the control valves were mounted on a spring-supported panel separate from the main valve and connected to it by flexible metallic tubing. The remedial measures were entirely successful and no further difficulty has been experienced with this valve.

The Nordstrom control valve and the Clayton pressure-reducing valve at the Hodges Control Station were dismantled on August 25, 1949 for the purpose of inspecting the interior of the valves. This was an opportune time for inspection of these high-head valves, because no water was being delivered through the station, due to trouble with a valve located on the City of San Diego's pipe line leading from the station. No evidence of cavitation was found in either valve and, except for slight wear on the composition seat of the Clayton valve, both were found to be in excellent condition.

A similar inspection was made of the plug valve at the Red Mountain Station in September 1949, while repairs were being made in the small piping connecting the Venturi meter tube with the instrument. A lubrication channel was found to be plugged but no indication of wear was evident on the interior of the valve.

The equipment installed in the four control stations consists of high-pressure regulating valves and Venturi meter tubes with their recording mechanisms. Venturi-type meters have been uniformly employed where maximum flows in excess of 1 c.f.s. are to be measured. Only one displacement-type meter is in service, the other six

meters being of the Venturi type. The meters have all given excellent service and no replacements have been required since their installation. The flow recording instruments are inspected and checked at regular intervals for corrosion and proper timing. A supply of powdered silica-gel is maintained in the instrument cases to reduce the moisture content of the air and to assist in reducing corrosion. In spite of these precautions, the clocks operating the recording charts have occasionally failed to operate, requiring replacement with another clock while repairs were being made.

Plug-type valves have been used at all metering stations for regulating the rate of the water deliveries. In order to maintain these valves in a safe operating condition, they are greased and opened and closed at least once each month. A special type of non-soluble grease injected into the valve fittings by a high-pressure hand-operated grease gun is used for this purpose.

Miscellaneous Maintenance Activities

On completion of the construction of the Aqueduct, the Navy engineers painted identifying station numbers on each structure. This paint gradually weathered and the structure identification numbers have been repainted this year and relocated on the structures so as to be more easily observed by the patrolmen. Also identification station numbers have been painted on all branch line structures.

In spite of posting "no trespass" signs, minor damage has occurred to the fences protecting aqueduct structures. At the southerly bifurcation structure of Lilac Tunnel, the upper portion of the enclosing fence, consisting of strands of barbed wire, was cut and the woven wire fence was pushed in. No damage was done to the structure. The fence was repaired and the wire replaced.

The metal work of all pipe line structures has been regularly examined and corrective measures taken to prevent rusting whenever necessary.

Seepage water has accumulated in several of the concrete valve vaults from seepage through the walls. In order to prevent corrosion of metal parts, structures were unwatered and the interior walls were treated with a heavy coat of cement plaster.

To facilitate the efficient patrolling of the Aqueduct and to comply with agreements made with property owners, metal swinging gates

have been installed at various points on the patrol roads. In most cases these gates are provided with two padlocks so that the gates can be opened independently by either the patrolman or the property owner.

Work performed at maintenance headquarters included the routine maintenance of buildings and grounds. The original roof covering the superintendent's residence was replaced with heavy asphalt shingles. The interior of the shop building was given its first coat of paint, resulting in a much better lighted interior. The exterior trim of the buildings was repainted and the exterior of the principal office building was given a coat of stucco. Roads and parking areas were surfaced with gravel as required.

TABLE 5
AUTHORITY-STORED WATER PLACED IN SAN VICENTE
RESERVOIR DURING FISCAL YEAR
(All quantities in acre-feet)

| Agency | Feb. | March | April | May | June | Total |
|---|---------|---------|---------|---------|-------|----------|
| Chula Vista & National City (Calif. Water & Tel. Co. Agent) | 0 | 1,500.0 | 1,079.0 | 921.0 | 0 | 3,500.0 |
| Fallbrook P.U.D. | 891.0 | 707.9 | 216.4 | 184.7 | 700.0 | 2,700.0 |
| Lakeside I.D. | 0 | 0 | 0 | 0 | 0 | 0 |
| La Mesa, Lemon Grove and Spring Valley I.D. | 445.5 | 992.2 | 303.4 | 258.9 | 0 | 2,000.0 |
| City of Oceanside | 0 | 0 | 0 | 0 | 0 | 0 |
| City of San Diego | 0 | 0 | 0 | 0 | 0 | 0 |
| San Dieguito I.D. | 0 | 0 | 809.3 | 690.7 | 0 | 1,500.0 |
| Santa Fe I.D. | 267.3 | 32.7 | 0 | 0 | 0 | 300.0 |
| Authority (for Evaporation).... | 133.7 | 177.7 | 161.1 | 137.5 | 42.0 | 652.0 |
| Total | 1,737.5 | 3,410.5 | 2,569.2 | 2,192.8 | 742.0 | 10,652.0 |

Water Sales

The total quantity of Colorado River water delivered for the current use of member agencies during the fiscal year was 58,612.1 acre-feet, an amount equal to an average flow of 81.0 c.f.s. In addition to the water so delivered, the Authority has stored water in the amount of 10,652.0 acre-feet in San Vicente Reservoir for future delivery as required by the six agencies ordering this water stored. Such water was placed in storage during the period from February

TABLE 6

TABLE 6
 DELIVERIES OF COLORADO RIVER WATER—1949-50
 (All figures in acre-feet)

| Constituent Areas | July | August | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | Yearly total | Yearly average |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------|----------------|
| | | | | | | | | | | | | | | c.f.s. |
| Chula Vista and National City (California Water & Tel. Co.) | 512.3 | 482.5 | 521.7 | 870.0 | 902.2 | 934.6 | 932.4 | 958.0 | 1,242.4 | 1,194.6 | 1,225.9 | 1,196.6 | 10,973.2 | 15.16 |
| Fallbrook Public Utility District | 267.4 | 317.9 | 300.2 | 113.9 | 196.6 | 139.6 | 112.4 | 111.9 | 293.6 | 331.0 | 395.8 | 423.7 | 3,004.0 | 4.15 |
| Lakeside Irrigation District | 1.8 | 2.2 | 1.1 | 1.5 | 2.2 | 1.0 | 0.4 | 0.2 | 1.3 | 4.2 | 6.0 | 8.5 | 30.4 | .04 |
| La Mesa, Lemon Grove & Spring Valley Irrigation District | 671.3 | 459.0 | 408.2 | 310.6 | 289.7 | 149.7 | 110.8 | 223.6 | 408.7 | 417.5 | 620.1 | 723.4 | 4,792.6 | 6.62 |
| Oceanside | 42.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41.2 | 44.3 | 127.8 | .18 |
| San Diego | 4,023.8 | 4,260.9 | 4,050.0 | 4,017.0 | 3,923.9 | 4,412.2 | 4,630.4 | 2,271.8 | 0 | 400.0 | 918.3 | 2,462.9 | 35,371.2 | 48.86 |
| San Dieguito Irrigation District | 153.7 | 153.7 | 208.3 | 215.2 | 178.5 | 184.5 | 61.1 | 0 | 66.1 | 309.3 | 124.6 | 0 | 1,655.0 | 2.28 |
| Santa Fe Irrigation District | 92.2 | 92.2 | 178.5 | 184.5 | 119.0 | 0 | 0 | 0 | 446.3 | 594.2 | 614.9 | 336.1 | 2,657.9 | 3.67 |
| Total to Agencies | 5,764.8 | 5,768.4 | 5,668.0 | 5,712.7 | 5,612.1 | 5,821.6 | 5,847.5 | 3,565.5 | 2,458.4 | 3,250.8 | 3,946.8 | 5,195.5 | 58,612.1 | 80.96 |
| Total to Authority Storage | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,737.5 | 3,410.5 | 2,569.2 | 2,192.8 | 742.0 | 10,652.0 | 14.71 |
| Total Deliveries | 5,764.8 | 5,768.4 | 5,668.0 | 5,712.7 | 5,612.1 | 5,821.6 | 5,847.5 | 5,303.0 | 5,868.9 | 5,820.0 | 6,139.6 | 5,937.5 | 69,264.1 | 95.67 |
| Rate of Flow | | | | | | | | | | | | | | |
| c.f.s. to Agencies | 93.8 | 93.8 | 95.3 | 92.9 | 94.3 | 94.7 | 95.1 | 64.2 | 40.0 | 54.6 | 64.2 | 87.3 | 81.0 | |
| c.f.s. to Authority Storage | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31.3 | 55.4 | 43.2 | 35.7 | 12.5 | 14.7 | |
| Total | 93.8 | 93.8 | 95.3 | 92.9 | 94.3 | 94.7 | 95.1 | 95.5 | 95.4 | 97.8 | 99.9 | 99.8 | 95.7 | |

69,342.2 acre-feet were delivered into San Diego Aqueduct by The Metropolitan Water District at San Jacinto Reservoir.

78.1 acre-feet total losses = 0.11%.

TABLE 6

| Constituent Areas | July | June | Yearly total | Yearly average |
|--|----------------|-------------|-----------------|----------------|
| | | | | c.f.s. |
| Chula Vista and National City (California Water & Tel. Co.) | 512.3 | 96.6 | 10,973.2 | 15.16 |
| Fallbrook Public Utility District | 267.4 | 23.7 | 3,004.0 | 4.15 |
| Lakeside Irrigation District | 1.8 | 8.5 | 30.4 | .04 |
| La Mesa, Lemon Grove & Spring Valley Irrigation District | 671.3 | 23.4 | 4,792.6 | 6.62 |
| Oceanside | 42.3 | 44.3 | 127.8 | .18 |
| San Diego | 4,023.8 | 62.9 | 35,371.2 | 48.86 |
| San Dieguito Irrigation District | 153.7 | 0 | 1,655.0 | 2.28 |
| Santa Fe Irrigation District | 92.2 | 36.1 | 2,657.9 | 3.67 |
| Total to Agencies | 5,764.8 | 95.5 | 58,612.1 | 80.96 |
| Total to Authority Storage | 0 | 42.0 | 10,652.0 | 14.71 |
| Total Deliveries | 5,764.8 | 37.5 | 69,264.1 | 95.67 |
| Rate of Flow | | | | |
| c.f.s. to Agencies | 93.8 | 87.3 | 81.0 | |
| c.f.s. to Authority Storage | 0 | 12.5 | 14.7 | |
| Total | 93.8 | 99.8 | 95.7 | |
| | 69,342.2 ac | | | |
| | 78.1 ac | | | |

15, 1950 to June 30, 1950, and the several amounts credited to the agencies are shown in Table 5. The storage of this water was made possible by an agreement with the City of San Diego, dated February 17, 1950, under which the Authority acquired the right for a period of five years to store up to 20,000 acre-feet whenever space is available in the reservoir. No deliveries of stored water were made during the fiscal year.

The monthly water deliveries from the direct flow of the Aqueduct are shown in Table 6. The maximum monthly quantity delivered was 5,847.5 acre-feet in January, 1950, while the minimum was 2,458.4 acre-feet in March, 1950.

During the year all Authority agencies received adequate deliveries of Colorado River water to supplement the supplies from local sources and no enforced rationing was required. The total quantity of water delivered by the San Diego Aqueduct was 2,306.0 acre-feet less than the quantity delivered in the fiscal year 1948-49, a reduction of 3.2 per cent. This decrease was due primarily to reduced capacity, resulting from a bacterial growth on the inside of the Aqueduct during the summer season. It is now apparent that summer flows above 95 c.f.s. cannot be carried safely by the Aqueduct without the operation of standby chlorinating equipment.

Water Consumption

The total quantity of water consumed by the agencies having membership in the Authority totaled 90,160 acre-feet, an increase of 6,358 acre-feet, or 7.6 per cent over the previous year's consumption. The City of San Diego was the largest water user, consuming 52,459.5 acre-feet, or 58 per cent of all water used within the area. Of this water, 34,956 acre-feet, or about 67 per cent, was Colorado River water. The water consumption within the area served by each agency is shown in Table 7, which includes a breakdown as to the sources of the water. As shown in this table, 56,072 acre-feet, or 62.2 per cent of all water consumed within the Authority area, was Colorado River water; the remaining 34,088 acre-feet, or 37.8 per cent, being obtained from local sources. The highest percentage-use of Colorado River water was in the area served by the California Water & Telephone Company, including the cities of Chula Vista and National City, where 85.6 per cent of the total water consumption was obtained from the Authority. The smallest percentage use of

TABLE 7
WATER CONSUMPTION BY CONSTITUENT AREAS—FISCAL YEAR 1949-50

| Constituent Areas | TOTAL WATER CONSUMPTION | | | | | SOURCE OF WATER | | |
|---|-------------------------|-----------|-----------|----------------|----------|-----------------|----------|--|
| | as ac. ft. | as m.g.d. | as c.f.s. | LOCAL | | COLORADO RIVER | | |
| | | | | Amount ac. ft. | Per cent | Amount ac. ft. | Per cent | |
| Chula Vista and National City (California Water & Tel. Co.) | 12,709 | 11.34 | 17.56 | 1,833 | 14.4 | 10,876 | 85.6 | |
| Fallbrook Public Utility District | 5,379 | 4.80 | 7.43 | 2,371 | 44.1 | 3,008 | 55.9 | |
| Lakeside Irrigation District | 161 | .14 | .22 | 131 | 81.4 | 30 | 18.6 | |
| La Mesa, Lemon Grove and Spring Valley Irrigation District | 10,204 | 9.11 | 14.09 | 5,411 | 53.0 | 4,793 | 47.0 | |
| Oceanside | 2,977 | 2.66 | 4.11 | 2,849 | 95.7 | 128 | 4.3 | |
| City of San Diego: | | | | | | | | |
| Inside City | 51,410 | 45.90 | 71.01 | 16,454 | 32.0 | 34,956 | 68.0 | |
| Outside City (not in Authority) | 1,049 | .94 | 1.45 | 1,049 | 100.0 | 0 | 0 | |
| San Dieguito Irrigation District | 2,899 | 2.59 | 4.00 | 1,778 | 61.3 | 1,121 | 38.7 | |
| Santa Fe Irrigation District | 3,372 | 3.01 | 4.66 | 2,212 | 65.6 | 1,160 | 34.4 | |
| Totals | 90,160 | 80.49 | 124.53 | 34,088 | 37.8 | 56,072 | 62.2 | |

NOTE: This table is a compilation of data furnished by member agencies. Figures include losses in transmission and distribution systems but not in conservation reservoirs.

TABLE 8
UNIT WATER USE—PER ACRE AND PER CAPITA—1949-1950

| Area | Gross Area (1) acres | Total use of water ac. ft. | Estimated area served by water system acres | Water duty ac.ft./acre | Estimated population | Water use per capita ac.ft./cap./yr. |
|--|----------------------|----------------------------|---|------------------------|----------------------|--------------------------------------|
| | | | | | | |
| California Water & Telephone Co. | | | | | | |
| In Chula Vista | 3,363 | 5,042 | 2,950 | 1.71 | 15,844 | .32 |
| In National City | 3,464 | 3,101 | (2) 2,776 | 1.12 | (2) 21,372 | .15 |
| Outside Cities (not in Authority) | 10,413 | 4,566 | 3,150 | 1.45 | 10,784 | .42 |
| Total (Calif. W. & T. Co.) | 17,240 | (3) 12,709 | 8,876 | 1.43 | 48,000 | .26 |
| Fallbrook Public Utility District | 5,000 | 5,379 | 3,850 | 1.40 | 5,500 | .98 |
| Lakeside Irrigation District | 1,560 | 161 | 750 | .21 | 2,000 | .08 |
| La Mesa, Lemon Grove and Spring Valley Irrigation District | 19,157 | 10,204 | 12,721 | .80 | 46,318 | .22 |
| Oceanside | 6,402 | 2,977 | 3,126 | .95 | 13,250 | .22 |
| San Diego—Inside City | 66,141 | 51,410 | 45,700 | 1.12 | 321,485 | .16 |
| Outside City (not in Authority) | (4) | 1,049 | (4) | — | (4) | — |
| San Dieguito Irrigation District | 4,020 | 2,899 | 2,860 | 1.01 | 6,282 | .46 |
| Santa Fe Irrigation District | 10,106 | 3,372 | 2,970 | 1.14 | 3,000 | 1.12 |
| Totals | 129,626 | 90,160 | 80,853 | 1.12 | 445,835 | .20 |

(1) Does not include those areas which are a part of the agencies but not a part of the Authority.

(2) Includes 60 acres in San Diego served by Calif. Water & Telephone Co., and supplying 240 people.

(3) Includes evaporation losses in Sweetwater and Loveland Reservoirs.

(4) Not available.

Colorado River water was in the city of Oceanside, where 4.3 per cent of the total water consumption was obtained from the Authority.

With a total water consumption during the year of 90,160 acre-feet, the average unit consumption within the Authority area equaled 0.2 acre-feet per year per capita, equivalent to 179 gallons per day per capita, or 1.1 acre-feet per acre within the gross area currently being serviced with water. The unit water use of each of the nine Authority agencies is shown in Table 8. The highest and lowest per acre use of water occurred in the city of Chula Vista, and in the Lakeside Irrigation District, with 1.71 acre-feet per acre and 0.21 acre-feet per acre, respectively. The highest use per capita occurred in the Santa Fe Irrigation District, with 1.12 acre-feet per capita, and the lowest in the Lakeside Irrigation District, with .08 acre-feet per capita.

The total amount of water consumed within the constituent areas of the Authority by fiscal years from July 1, 1940 to June 30, 1950, is shown in Table 9. It will be noted that the total water use has increased from 46,659 acre-feet in 1940-41, to 90,160 acre-feet in 1950, a percentage increase of 93 per cent.

Preferential Water Rights of Member Agencies

The preferential rights of the constituent areas to purchase water from the San Diego County Water Authority are determined from time to time by a procedure specifically set forth in the County Water Authority Act. In effect, such preferential right bears the same relationship to the flow of the Aqueduct as the total accumulated taxes and related sums paid by each agency to the Authority (excluding payments for water) bear to the total of similar amounts paid to the Authority by all its agencies. Thus the preferred right of an agency is the right to purchase a flow of water which may vary from time to time with the total aqueduct flow and the ratio of the agency's tax payments to the total tax payments collected by the Authority from all the agencies since its organization.

The estimated preferred rights of the Authority agencies in the present capacity of the San Diego Aqueduct are shown in Table 10. In view of the fact that areas which have annexed to the Authority after its initial formation have been required to obligate the taxpayers of the area for a special tax, equal to the total taxes which they would have paid if a member of the Authority from its organization

TABLE 9
WATER USE BY CONSTITUENT AREAS—FISCAL YEARS 1940-41 to 1949-50
(All figures in acre-feet)

| Agency | From Local Sources | | | | | | | | | From Local and Authority Supplies | | |
|---|--------------------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------------------------------|--|--|
| | 1940-41 | 1941-42 | 1942-43 | 1943-44 | 1944-45 | 1945-46 | 1946-47 | 1947-48 | 1948-49 | 1949-50 | | |
| Chula Vista and National City (California Water and Tel. Co.) (1) | 7,502 | 9,588 | 9,048 | 9,963 | 9,288 | 10,799 | 10,519 | 10,265 | (2)11,293 | (2)12,709 | | |
| Fallbrook Public Utility District | 576 | 951 | 1,232 | 1,464 | 1,439 | 2,120 | 2,596 | 3,470 | 3,613 | 5,379 | | |
| Lakeside Irrigation District | 47 | 44 | 60 | 61 | 65 | 69 | 90 | 103 | 110 | 161 | | |
| La Mesa, Lemon Grove and Spring Valley Irrigation District | 4,895 | 4,903 | 6,455 | 7,316 | 7,423 | 8,920 | 9,790 | 10,290 | 9,325 | 10,204 | | |
| Oceanside | 1,149 | 1,189 | 1,508 | 1,713 | 1,881 | 2,304 | 2,519 | 2,787 | 2,641 | 2,977 | | |
| City of San Diego: | | | | | | | | | | | | |
| Inside City | 27,490 | 34,506 | 43,966 | 49,742 | 53,473 | 56,266 | 49,431 | 51,078 | 49,693 | 51,410 | | |
| Outside City (not in Authority) | 286 | 384 | 504 | 815 | 1,223 | 1,147 | 1,038 | 1,329 | 1,946 | 1,049 | | |
| San Diego Irrigation District | 2,014 | 1,917 | 2,280 | 2,521 | 2,611 | 2,966 | 3,369 | 3,034 | 2,899 | 2,899 | | |
| Santa Fe Irrigation District | 2,700 | 2,503 | 3,073 | 3,300 | 2,760 | 3,539 | 3,512 | 3,491 | 2,878 | 3,372 | | |
| Totals | 46,659 | 55,985 | 68,126 | 76,895 | 80,163 | 88,130 | 82,864 | 85,847 | 83,802 | 90,160 | | |

(1) Includes some water sold to areas adjacent to the two cities.

(2) Includes evaporation losses of Colorado River water in Sweetwater Reservoir.

TABLE 10
ESTIMATED PREFERENTIAL ENTITLEMENT TO PURCHASE COLORADO RIVER WATER
as of June 30, 1950

| Constituent Areas | Total Amount paid by each member agency to 6/30/50 | Amount remaining to be paid under terms of annexation | Total contributions paid and contracted for | Preferential right to purchase | | Equivalent Annual Delivery ac. ft. |
|--|--|---|---|--------------------------------|------------------|------------------------------------|
| | | | | Percentage of aqueduct flow | Equivalent flow | |
| Chula Vista | \$ 50,057.84 | \$ -0- | \$ 50,057.84 | 3.23 | 3.07 | 2,223 |
| Fallbrook Public Utility District | 9,825.29 | -0- | 9,825.29 | .63 | .60 | 435 |
| Lakeside Irrigation District | 2,296.92 | -0- | 2,296.92 | .15 | .14 | 101 |
| La Mesa, Lemon Grove & Spring Valley Irrigation District | 110,037.25 | -0- | 110,037.25 | 7.10 | 6.75 | 4,887 |
| National City | 41,801.92 | -0- | 41,801.92 | 2.70 | 2.56 | 1,853 |
| Oceanside | 35,551.88 | -0- | 35,551.88 | 2.29 | 2.18 | 1,578 |
| San Diego | 1,266,864.66 | -0- | 1,266,864.66 | 81.74 | 77.65 | 56,216 |
| San Dieguito Irrigation District | 6,193.68 | 12,240.43 | 18,434.11 | 1.19 | 1.13 | 818 |
| Santa Fe Irrigation District | 4,694.51 | 10,395.19 | 15,089.70 | .97 | .92 | 666 |
| Total Authority | \$1,527,323.95 | \$22,635.62 | \$1,549,959.57 | 100.00 | 95.00 (1) | 68,777 |

(1) Based on present single barrel aqueduct.

date, said amount becoming due over a period of years, it has been necessary to estimate the preferred rights on a practical basis which assumes that the amount of such special taxes have been paid to the Authority on the date of its annexation. Otherwise they would have had no entitlement to purchase water during the first year of their membership. Thus the tentative preferred rights, as shown in Table 10, of the San Dieguito and Santa Fe Irrigation Districts which have recently been annexed to the Authority, are larger than they would be if based only on the sums of money actually paid to the Authority as of June 30, 1950.

It should be pointed out that up to the present time, the amounts of Colorado River water delivered to the agencies have been prorated on the basis of need rather than on the basis of preferred rights. Until there is a general water shortage it is unlikely that there will be any necessity for apportioning the flow of the Aqueduct in accordance with the preferred rights section of the County Water Authority Act.

Water Quality

Because the purpose of the Authority is to deliver water in wholesale amounts to its several agencies for distribution to consumers, no attempt is being made to treat Colorado River water or to prepare it in any manner for human consumption.

Samples of water taken monthly by the Metropolitan Water District from the flow in the Colorado River Aqueduct at the San Jacinto Tunnel outlet, show a maximum of dissolved solids of 626 ppm and a total hardness of 309 ppm. The monthly analyses of these samples are shown in Table 11.

Weekly samples of Colorado River water taken at the Lakeside Control Station by the City of San Diego have been analyzed in the City laboratories to determine the chemical constituents of the water entering San Vicente Reservoir. Copies of such analyses furnished by the City show a slight decrease in the total alkalinity of the water at this point as compared with the water entering the Aqueduct at the San Jacinto Tunnel. No reason for the indicated difference is apparent, and since these analyses show similar results in other respects when compared with the District's analyses, they have not been included in this report.

TABLE 11

CHEMICAL CHARACTER OF NATURAL COLORADO RIVER WATER

Year Ending June 30, 1950

Samples taken at entrance to San Diego Aqueduct by M.W.D. and analyzed at District Laboratory

| Month | Total Hardness as P.P.M. of CaCO ₃ | Non Carbonate Hardness as P.P.M. of CaCO ₃ | Alkalinity as P.P.M. of CaCO ₃ | | Magnesium as P.P.M. of Mg. | Hydrogen Ion Concentration | Temperature when sampled F° |
|-----------|---|---|---|----------------|----------------------------|----------------------------|-----------------------------|
| | | | Total | Phenolphthalen | | | |
| July | 296 | 182 | 116 | 2 | 27.0 | 8.3 | 80° |
| August | 295 | 180 | 117 | 2 | 25.0 | 8.3 | 82° |
| September | 293 | 181 | 116 | 4 | 25.0 | 8.3 | — |
| October | 288 | 172 | 119 | 3 | 24.5 | 8.3 | 78° |
| November | 293 | 172 | 121 | 0 | 25.0 | 8.2 | 69° |
| December | 277 | 160 | 119 | 2 | 22.5 | 8.3 | 61° |
| January | 280 | 159 | 125 | 4 | 22.5 | 8.3 | — |
| February | 287 | 163 | 130 | 6 | 22.5 | 8.4 | 54° |
| March | 294 | 169 | 128 | 3 | 23.5 | 8.3 | 62° |
| April | 296 | 172 | 127 | 3 | 24.0 | 8.3 | 64° |
| May | 309 | 187 | 127 | 5 | 26.0 | 8.4 | 67° |
| June | 304 | 183 | 124 | 3 | 26.0 | 8.4 | 75° |
| Average | 293 | 173 | 122 | 3 | 24.5 | 8.3 | 69° |
| Maximum | 309 | 187 | 130 | 6 | 27.0 | 8.4 | 82° |
| Minimum | 277 | 159 | 116 | 0 | 22.5 | 8.2 | 54° |

NOTE: For other constituents in water see Table 20.

SECTION II
ENGINEERING

THE increasing demand for new sources of water has resulted in numerous inquiries regarding the possible annexation to the Authority of additional new units. Also the areas presently constituting the Authority are continually annexing new territory. This has necessitated engineering work of some magnitude, preparing changes in boundary descriptions for record purposes, and making studies relating to water supplies and annexation costs.

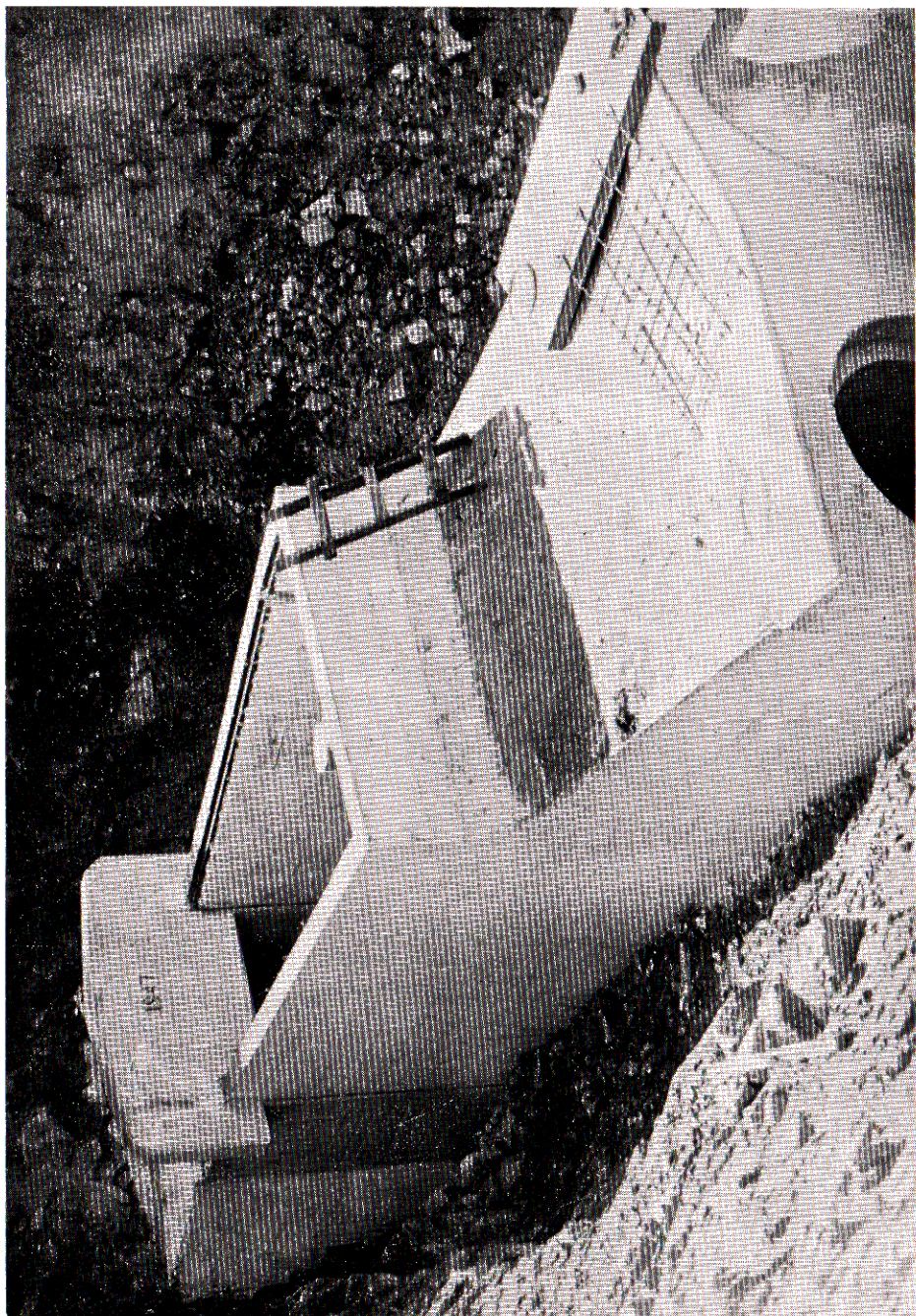
During the year no new facilities were added to the Authority water system, but engineering studies relating to the completion of the San Diego Aqueduct have continued to require the attention of the engineering staff. Occasional assistance has been given to the Bureau of Reclamation engineers in the preparation of data for their forthcoming report on the completion of the San Diego Aqueduct. Also plans were prepared for two additional service outlets to be located on branches of the main Aqueduct near Rainbow and Lakeside.

In general, the engineering work accomplished during the year has included a multitude of small tasks relating to the maintenance of records on delivery and use of water, and the preparation of office studies and reports pertaining to operations of the Authority.

San Diego Aqueduct Completion Studies

Initiated in 1944 as a war emergency project, the San Diego Aqueduct, constructed by the U. S. Navy, went into operation late in 1947, barely in time to avert a drastic and disastrous water shortage in the City of San Diego and the six other nearby communities which then comprised the Authority membership. For reasons beyond the control of local officials and the Government Bureaus involved in its design and construction, the Aqueduct was built to convey to these communities only about one-half of the full water rights of the area. However, its ultimate enlargement was wisely provided for by building tunnels and other difficult sections of the line to full capacity.

Now, after the one-half capacity Aqueduct has been under operation for a period of about three years, it has become clear that the



Bifurcation Structure at Oat Hills Tunnels showing provision for future second barrel construction

new Aqueduct alone has insufficient capacity to supply the full needs of the Authority area without dependence on supplies from local water sheds which have been reduced to a dangerously low level by a sustained drought. Due to the continuing growth of the communities constituting the Authority, it became apparent a year ago that early steps should be taken looking toward the completion of the Aqueduct by the construction of the second barrel. To this end a contract was entered into between the Authority and the Bureau of Reclamation providing for a report by that Bureau on the need and feasibility of completing the Aqueduct. This report should be completed by the end of 1950.

It is hoped that the Bureau's report will provide a basis for the construction and financing of the second barrel by the Federal Government, which now holds title to the present Aqueduct and its right of way, subject to terms of a repayment contract with the Authority. This contract makes it difficult, if not impossible, to secure private financing for completing the Aqueduct project.

For the purpose of exploring the possibility that the second barrel might be built more advantageously on a more westerly location than that followed by the first barrel, the Authority staff made rather extensive office studies of possible alternate routes in advance of contracting with the Bureau of Reclamation for a formal report on the need and feasibility of enlarging the present Aqueduct. The results of these studies were turned over to the Bureau engineers in April, 1949 after consummation of the contract.

During the year the Bureau of Reclamation engineers made field reconnaissance of the routes previously studied by the Authority and of other locations, and held conferences with the Authority personnel relative to their findings. These investigations led to the decision to confine the Bureau's study to three possible locations, as follows:

1. A line paralleling the present Aqueduct barrel and located within the right of way purchased by the Government for the construction of the first barrel.
2. A line diverting from the existing Aqueduct at a point about four miles north of Escondido and extending generally southwesterly to cross the San Dieguito River directly below Hodges Dam; and thence southerly, terminating at the City of San Diego's boundary northeasterly of Linda Vista.
3. A line diverting from the existing Aqueduct at the south portal

of Poway Tunnel; extending southerly in Sycamore Canyon to cross the San Diego River near Santee, connecting with the easterly portal of Alvarado Tunnel, and terminating in Grossmont Reservoir.

Acquisition of Rights of Way for Access and Patrol Roads

After the Authority assumed responsibility for the maintenance and operation of the southerly one-half of the San Diego Aqueduct, it became necessary to plan an integrated system of roads which would provide the most direct access to all sections of the Authority-operated portion of the Aqueduct. As a result of the plans developed in early 1948, a program for securing rights of way on existing roads, and for constructing new roads, was adopted by the Authority. Details of this program are more fully described in the Third Annual Report.

The acquisition of the rights of way provided for under the program was completed during the past year. The executed easement forms, together with plats and descriptions of the property involved, have been filed in the County Recorder's office. These instruments involve 27 owners of 42 parcels of land covering 11.0 miles of access roads.

Changes in the Corporate Area of the Authority

The corporate area of the Authority as of June 30, 1950 totaled 119,213 acres, an increase of 3,305 acres during the year. The increase was entirely due to annexation of new territory to the four city members of the Authority. Annexations to any city included in the Authority as a separate unit automatically result in annexations to the Metropolitan Water District and to the Authority. As required by the Authority Act, legal descriptions of each separate area annexed during the fiscal year, together with maps thereof, were submitted to the Authority by the cities and carefully reviewed and checked by the engineering and legal staff. Copies of these instruments, together with statements showing that the information has been filed with the County Assessor and the Board of Equalization, were then transmitted to the Metropolitan Water District for their records. Base maps of the Authority's corporate area are being continuously revised to show such new annexations as they occur. Data summarizing the changes in area made during the fiscal year 1949-50 are shown in Table 12.

TABLE 12
CONSTITUENT AREAS OF THE AUTHORITY
as of June 30, 1950

| Constituent Areas | Area Within Authority—Acres | | | Per cent of total Authority area 6/30/50 |
|--|-----------------------------|---------------------|----------------|--|
| | As of 6/30/49 | Changes during year | As of 6/30/50 | |
| | acres | acres | acres | |
| Chula Vista | 3,283 | + 80 | 3,363 | 2.82 |
| Fallbrook Public Utility Dist. (1) | 5,000 | 0 | 5,000 | 4.19 |
| Lakeside Irrigation Dist. (1) (2) | 1,560 | 0 | 1,560 | 1.31 |
| La Mesa, Lemon Grove & Spring Valley Irrigation Dist.: (2) (3) | | | | |
| In City of El Cajon | (812) | + 1 | (813) | (0.68) |
| In City of La Mesa | (1,900) | 0 | (1,900) | (1.60) |
| In Crest Public Utility Dist. | (386) | 0 | (386) | (.32) |
| In unincorporated areas | (16,059) | - 1 | (16,058) | (13.47) |
| Total (1) | 19,157 | 0 | 19,157 | 16.07 |
| National City | 3,425 | + 39 | 3,464 | 2.91 |
| Oceanside | 6,013 | + 389 | 6,402 | 5.37 |
| San Diego | 63,344 | + 2,797 | 66,141 | 55.48 |
| San Dieguito Irrig. Dist. (2) (3) | 4,020 | 0 | 4,020 | 3.37 |
| Santa Fe Irrigation District | 10,106 | 0 | 10,106 | 8.48 |
| Total Authority Area (1) | 115,908 | + 3,305 | 119,213 | 100.00 |
| San Diego County | | | 2,725,100 | |

- (1) Area revised from that in Third Annual Report, to conform with revised data received from agency.
 (2) Does not include areas annexed to agencies without making the same a part of the Authority.
 (3) Includes areas excluded from agency but still a part of the Authority.

The La Mesa, Lemon Grove and Spring Valley Irrigation District and the San Dieguito Irrigation District have annexed territory to their corporate areas during the fiscal year without making these lands a part of the corporate area of the Authority. In accordance with the requirements of the Authority Act, these agencies have filed with the Authority descriptions and maps showing details of these annexations. All such boundary descriptions and maps were carefully checked and the changes were plotted on the base maps for record purposes. Duplicate copies of these filings were transmitted to the Metropolitan Water District for their records.

The total acreage included within the corporate boundaries of

the member agencies as of June 30, 1950 and the portion thereof lying within the Authority are shown in Table 13.

TABLE 13
AREAS OF MEMBER AGENCIES LYING WITHIN
AND WITHOUT THE BOUNDARIES OF THE AUTHORITY
as of June 30, 1950

| Member Agency | Total area lying within agency boundaries | Area with-in agency but not a part of Authority | Area with-in agency and a part of Authority | Area excluded from agency but still a part of Authority | Total area within Authority's boundaries |
|--|---|---|---|---|--|
| | Acres | Acres | Acres | Acres | Acres |
| Chula Vista | 3,363 | 0 | 3,363 | 0 | 3,363 |
| Fallbrook P. U. D. | 5,000 | 0 | 5,000 | 0 | 5,000 |
| Lakeside Irrig. Dist. ... | 2,008 | 448 | 1,560 | 0 | 1,560 |
| La Mesa, Lemon Gr. & Spring Valley I. D. | 22,011 | 3,361 | 18,650 | 507 | 19,157 |
| National City | 3,464 | 0 | 3,464 | 0 | 3,464 |
| Oceanside | 6,402 | 0 | 6,402 | 0 | 6,402 |
| San Diego | 66,141 | 0 | 66,141 | 0 | 66,141 |
| San Dieguito I. D. | 3,993 | 30 | 3,963 | 57 | 4,020 |
| Santa Fe Irrig. Dist. ... | 10,106 | 0 | 10,106 | 0 | 10,106 |
| Totals | 122,488 | 3,839 | 118,649 | 564 | 119,213 |

NOTE: An area when annexed to a city which is an independent agency of the Authority is automatically annexed to the Authority.

Service Connections

Eucalyptus Service Connection. Improvement District No. 1 of the Lakeside Irrigation District, located north of and noncontiguous with the remaining area of the Lakeside Irrigation District, has no water distribution system, its water being normally obtained from wells. Most of the wells in the area have now gone dry and the minimum water needs of the area are being supplied from wells located outside of the District in the San Diego River valley. This water is being hauled from the wells by the water users in the area.

When the La Mesa-Sweetwater Extension was constructed, a 6-inch nozzle was installed in the 39-inch concrete pipe at a convenient point for servicing the Improvement District area. As no immediate use of the outlet was planned, the only equipment then installed was a gate valve on the nozzle, to permit the later installation of the control and metering equipment without stopping the flow in the main line.

During the year a consulting engineer was engaged by the Lakeside Irrigation District to prepare plans for a distribution system to serve this area. Information on the requirements of the Authority for metering and control equipment and on the hydraulic characteristics of the pipe line at the point of delivery were furnished to the engineer, who then proceeded with the design of the system. It developed that the District required a pumping station to boost deliveries from the pipe line to a proposed distribution reservoir. The completion of the District's plans enabled the engineering staff to proceed with the preparation of designs for a metering and control station to serve the area and to inform the District of the estimated cost thereof which must be paid by it.

As of June 30, 1950 the District had been unable to complete financial arrangements for the construction of the distribution system and was considering the installation of a temporary meter and hydrant which would shorten the length of the haul required to service the local residents of the area until the distribution system could be financed.

Rainbow Service Connection. During the year a critical water shortage developed in the vicinity of Rainbow, when practically all local wells failed. At the urgent request of the officials of the recently formed Rainbow Public Utility District, the Authority agreed to install a temporary connection on the Fallbrook-Oceanside Branch line at the District's expense, and the Fallbrook Public Utility District agreed to sell the Rainbow Public Utility District an amount of water not to exceed 100 acre-feet, all to be delivered prior to January 1, 1950. Plans for the required valve and meter installation and an estimate of its cost were prepared by the engineering staff. Final authorization by the Fallbrook Public Utility District to proceed with the installation of this connection was being processed at the end of the fiscal year.

Reports on Areas Seeking Annexation

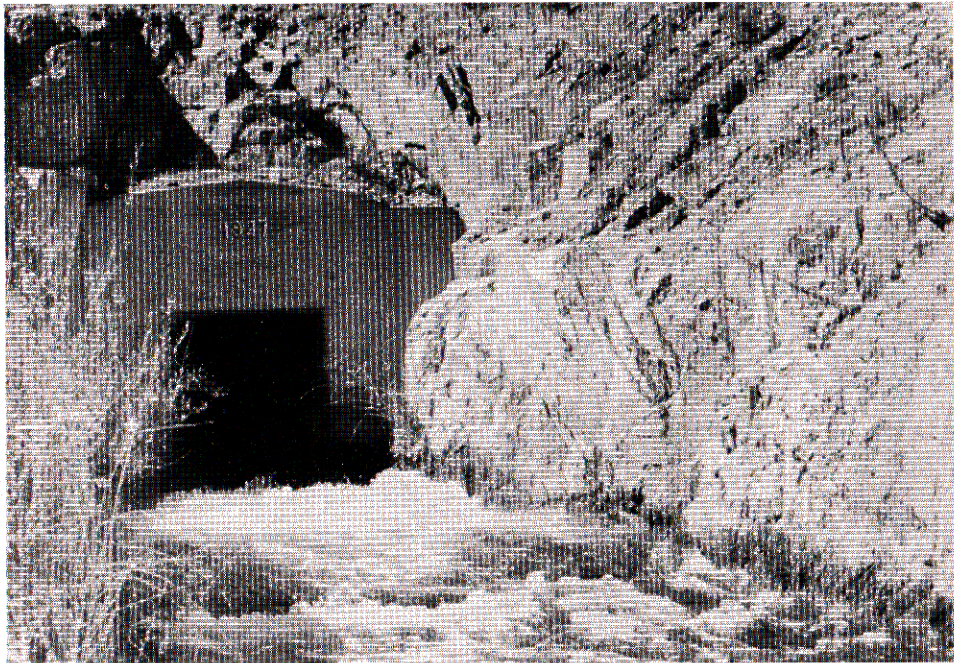
The increasing need for obtaining supplemental supplies of water led numerous individuals to request informal information from the Authority staff relative to the possible terms and conditions under which new areas might be annexed to the Authority. The requested information was supplied in all cases, and in some instances the information so supplied resulted in the making of more formal applications to the Board of Directors for annexation of new areas

to the Authority. Six such applications were under active consideration at the end of the year.

It has been the practice of the Board of Directors to require the staff to make an engineering report on each area seeking annexation, covering the factual data relative to the area's water supply, its need for Colorado River water, the assessed valuation and financial status, as well as the estimated cost of such annexation and the amount of water which the area would be entitled to receive if annexed. Four such reports were rendered during the past year and made available to the Authority Board and the interested agencies.

Authority Storage in San Vicente Reservoir

Early in 1950 the Authority staff held conferences with representatives of the City of San Diego, looking toward the negotiation of a contract between the Authority and the City providing for the storage of Colorado River water in San Vicente Reservoir. The purpose of such an agreement would be to permit Authority agencies other than



East Portal of San Vicente Tunnel

the City of San Diego, which have little or no storage facilities, to store water in the winter season for use in meeting their high summer demands. The agreement would also permit all the agencies to take advantage of Authority financing during the storage period, since payments for the water would be made at the time of its delivery rather than at the time the water was stored.

As a result of the negotiations, the Authority on February 17, 1950 entered into a five-year agreement with the City of San Diego under the terms of which the Authority obtained the right to store water up to the maximum amount of 20,000 acre-feet in San Vicente Reservoir if and when such capacity is available. The terms of the contract provide for payments by the Authority to the City for use of the reservoir. The terms also provide for proportioning any water which would be lost by spillage in the event of a flood between the City and the Authority on the basis of the relative amounts of water being held in storage by the respective parties at the time of the overflow.

The agencies taking advantage of the terms of this contract, together with the quantities of water stored for their respective accounts, are shown in Table 5.

Since the City of San Diego alone owns the discharge lines leading from San Vicente Reservoir, no other Authority agency can take direct delivery of the water stored in the reservoir. The Authority-stored water must therefore necessarily be turned over to the City concurrently with the delivery of a like amount of water from the direct flow of the Aqueduct. The storage contract provides that the City shall accept delivery of water stored for the account of any of the other agencies at such times as these agencies desire to receive water directly from the Aqueduct in lieu of water stored for their account in the reservoir. The storage contract also provides that the City shall accept delivery of any stored water whenever it may be released by an agency.

As of June 30, 1950 a total of 10,652.0 acre-feet had been stored by the Authority in San Vicente Reservoir for the account of member agencies. No deliveries of stored water have as yet been made. Monthly statements are rendered to all Authority agencies showing the status of the water in storage.

Miscellaneous Engineering Activities

On several occasions the Authority and the Metropolitan Water District have assisted officials of the Navy Department in obtaining easements over lands on which the Aqueduct had been previously constructed. Such assistance has included the performance of a small amount of work by the Authority or the District on the rights of way, a condition precedent to an agreement on a price to be paid by the Navy Department for the right of way easement.

The maintenance of accurate records relating to the boundaries of the agencies comprising the Authority is an important and growing function of the engineering staff. Such records must be brought up to date and filed with the County Assessor, State Board of Equalization and the Metropolitan Water District prior to March 1st of each year, in order that newly annexed areas may be taxed for the ensuing year. Numerous changes in the boundaries of the Authority, as the result of automatic annexations to the cities included in Authority membership, occurred during the past year. Eleven parcels of land, totaling 3,305 acres, were annexed in this manner during the period. Each parcel required the detailed checking of legal descriptions and maps before filing with the Metropolitan Water District. Table 12 shows the areas thus annexed to the cities.

The organic act of the Authority provides for the filing of records involving any changes in the boundaries of its agencies. Such changes may include the addition of new territory to the agencies without its becoming a part of the Authority area, or the exclusion of territory from the agencies' areas without the exclusion thereof from the Authority area. The record of such changes in boundaries, as initiated by the agencies, also must be checked by the engineering staff and filed with the Metropolitan Water District. Table 13 shows the detail of such changes.

SECTION III
CONSTRUCTION

WHILE no new construction work was initiated during the year, several small projects, under way at the beginning of the year, were carried through to completion. These projects were described in detail in the Third Annual Report and will be only outlined in this report.

Red Mountain Control Station

The Red Mountain Control Station contains the valves and metering equipment required to regulate and deliver water from the Fallbrook-Oceanside Branch into the Red Mountain Reservoir of the Fallbrook Public Utility District. Although initial water deliveries from this station began on July 9, 1949, construction of the station was not fully completed until August, 1949. The station has been in satisfactory service since that time.

Access and Patrol Roads

The Authority has constructed or improved about 37 miles of road required for the efficient patrol of the Aqueduct and the branch lines, the major part of which was completed in the previous year. Works completed during the current year included the construction of a road in the upper Moosa Canyon area, 2200 feet in length, where a relocation of the old road to a new location was found to be necessary. As constructed, with Authority personnel and equipment, the work included rather deep cuts, one of which was in solid rock and required blasting. This road was completed in November, 1949.

A short reach of new road was constructed on the right of way of the Aqueduct in Slaughterhouse Canyon, for the purpose of shortening the travel between the La Mesa-Sweetwater diversion structure and the north portal of San Vicente Tunnel. The construction of this 600-foot reach of road made possible the abandonment of 2200 feet of access road located on a steep hillside. In addition to constructing the new reach of road, all the access and patrol roads in the Slaughterhouse Canyon region were graded and



Access roads to Aqueduct in Slaughterhouse Canyon

the vulnerable sections surfaced with tunnel muck. Eight hundred cubic yards of muck were used for this purpose.

The Authority entered into an agreement with the County Road Department to pay for one-half the cost of reconstructing Betsworth Road, a county road leading from Valley Center to a point on the Aqueduct just north of Oat Hill Tunnel. As constructed by county personnel, the road was completed in May, 1950, within the estimated cost. In appreciation for the Authority's help in financing the work, the property owners in this area granted easements to the Authority without cost for certain patrol roads along the Aqueduct line. These roads extend between the Oat Hill and Red Mountain tunnels and over Oat Hill Mountain. The easements permitted the reconstruction of adequate access and patrol roads through this region which embraces perhaps the most rugged terrain traversed by the Aqueduct.

The original road leading to the south portal of Oat Hill Tunnel was constructed by the tunnel contractor for access to his work. This road was very steep and extremely difficult to keep in passable shape. To improve the situation a new access road was constructed on the right of way which provides an easier approach to the tunnel portal and can be maintained with less expense.

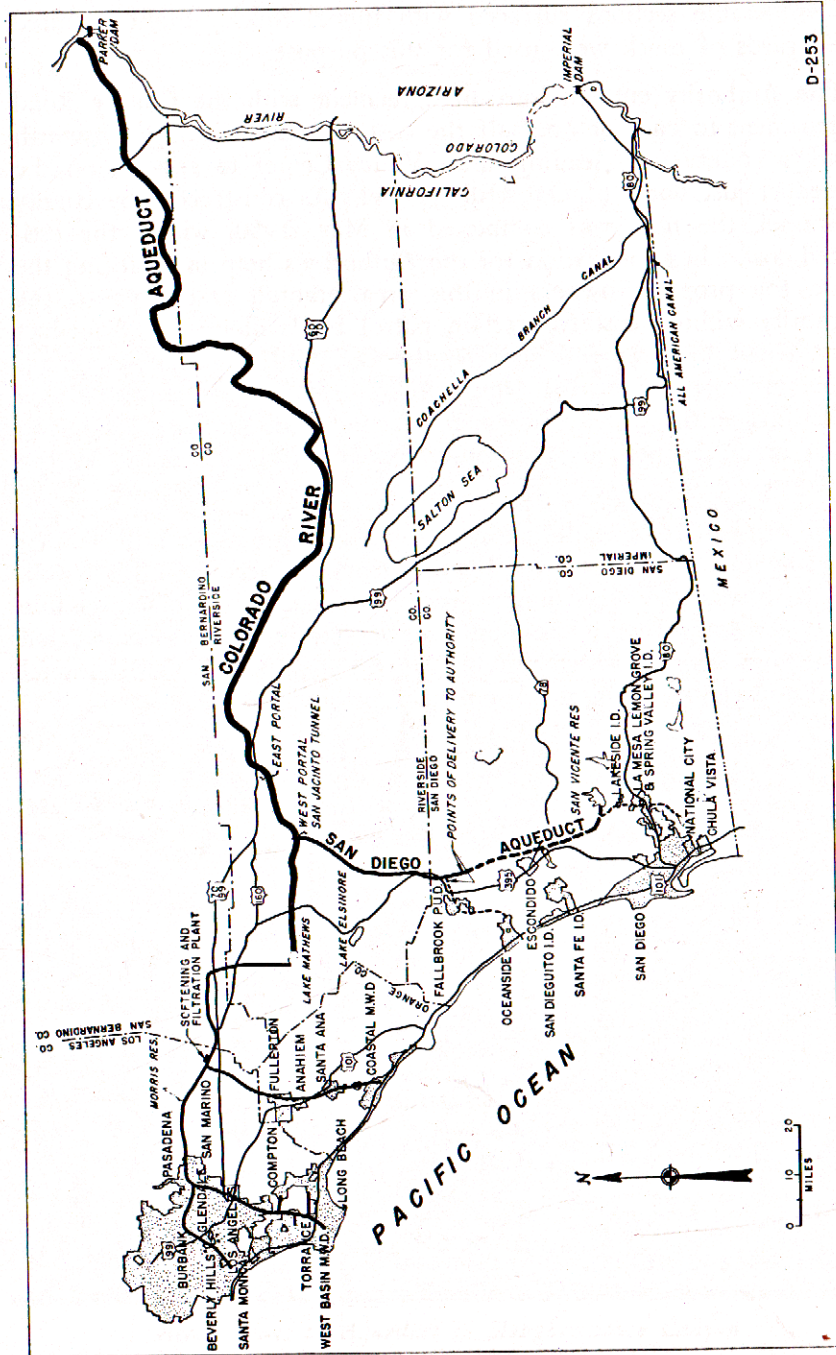


Figure 3. Colorado River Aqueduct System and Areas served by the Metropolitan Water District.

SECTION IV

METROPOLITAN WATER DISTRICT

THE corporate area of the Metropolitan Water District of Southern California now consists of the constituent areas of sixteen member municipalities, embracing a total area of about 910 square miles. (Ref. Figure 3). Included therein are the corporate areas of 29 cities, 13 water districts, and certain unincorporated areas. The cities range in size from the City of Los Angeles, with an area of about 450 square miles, to the City of El Cajon, with an area of about 1.3 square miles. The San Diego County Water Authority, one of the sixteen member municipalities, is the second largest member of the District in assessed valuation and extent of area. The City of San Diego has a population second only to that of Los Angeles.

As one of the member municipalities constituting the Metropolitan Water District, the Authority is entitled to purchase Colorado River water from the District and has the obligation to pay its proportion of District tax levies. By the terms of the agreement under which the Authority annexed to the District, the District operates and maintains the northerly one-half of the San Diego Aqueduct and repays the Authority one-half of all payments made by it to the Federal Government under the lease-purchase contract between the Authority and the Federal Government. As a member of the District, the Authority has a vital interest in all its operations and has two representatives on the District's Board of Directors. For this reason, current information and data relative to the operations of the District are briefly summarized in this section.

Assessed Valuation

The assessed valuation of the taxable property within the corporate area of the District has continued to increase for the ninth consecutive fiscal year since 1940-41, and is now 127 per cent greater than the valuation as of that date. The 1949-50 assessed valuation is \$4,181,812,855, an increase over the previous year of about \$299,000,000, or 8 per cent. The assessed valuation by years is shown in Table 14.

Tax Rates

The District's regular tax rate for the year 1949-50 on the taxable

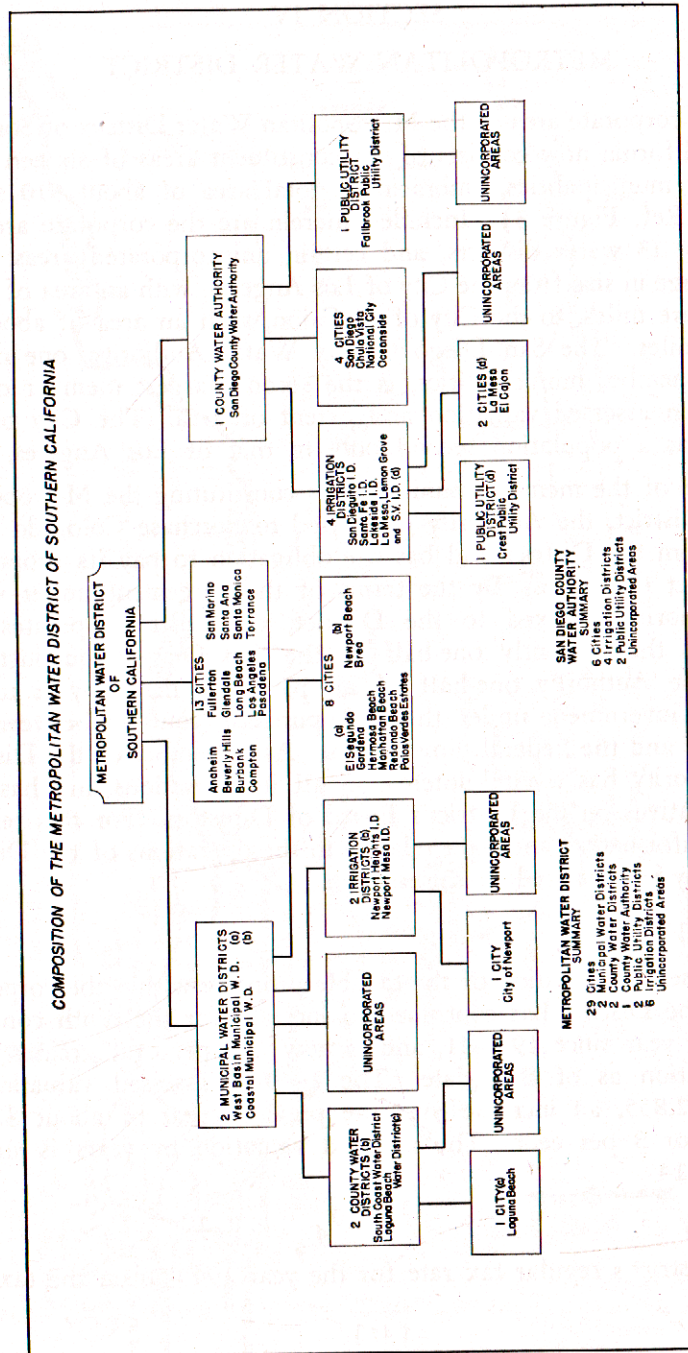


Figure 4. Composition of the Metropolitan Water District of Southern California.

property within its corporate area was 34c per \$100 of assessed valuation, as in the previous year. This tax rate yielded a total of about \$14,821,000. The District's regular tax rate for successive fiscal years beginning with 1929-30, is shown in Table 14.

TABLE 14
ASSESSSED VALUATIONS AND TAX RATES OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA.

| Fiscal Year | Assessed Valuations Total (1) | Tax Rate Per \$100 Secured (2) |
|-------------|-------------------------------|--------------------------------|
| 1929-30 | \$2,439,836,920 | \$0.04 |
| 1930-31 | 2,431,684,250 | .03 |
| 1931-32 | 2,382,184,445 | .03 |
| 1932-33 | 1,936,051,180 | .04 |
| 1933-34 | 1,654,403,890 | .04 |
| 1934-35 | 1,587,147,565 | .10 |
| 1935-36 | 1,783,531,020 | .20 |
| 1936-37 | 1,789,160,685 | .37 |
| 1937-38 | 1,827,765,725 | .40 |
| 1938-39 | 1,896,966,255 | .40 |
| 1939-40 | 1,910,152,190 | .42 |
| 1940-41 | 1,841,248,450 | .49 |
| 1941-42 | 1,900,599,934 | .48 |
| 1942-43 | 2,001,924,735 | .48 |
| 1943-44 | 2,005,496,430 | .48 |
| 1944-45 | 2,109,192,795 | .48 |
| 1945-46 | 2,159,731,425 | .50 |
| 1946-47 | 2,413,186,570 | .48 |
| 1947-48 | 3,443,212,822 (3) | .35 |
| 1948-49 | 3,883,081,225 | .34 |
| 1949-50 | 4,181,812,855 | .34 |

- (1) Includes secured, unsecured, and public utility valuations.
- (2) Unsecured tax rate is equal to rate set for previous year.
- (3) First year in which Authority assessed valuation was included in District's assessed valuation.

In addition to its regular tax, the District levies a special tax over a period of years against the corporate area of the Authority and other municipalities which were annexed subsequent to the organization of the District. This tax is designed to pay the annexation charges, or "back taxes," which in the case of each annexation is computed as a lump sum figure, to be paid over the number of years set forth in the annexation terms. Such charges are made in lieu of the regular taxes which the annexing municipality would have paid had it been a member of the District from the date of its

TABLE 15

**METROPOLITAN WATER DISTRICT SPECIAL TAX RATES
ON AUTHORITY AGENCIES**

| Agency | Special Tax Rate—Cents per \$100 | | | |
|--|----------------------------------|---------|---------|---------|
| | 1947-48 | 1948-49 | 1949-50 | 1950-51 |
| Chula Vista | 17 | 13 | 11 | 11 |
| Fallbrook Public Utility District | 17 | 13 | 11 | 11 |
| Lakeside Irrigation District | 17 | 13 | 11 | 11 |
| La Mesa, Lemon Grove and Spring Valley Irrigation District: | | | | |
| Original area | 17 | 13 | 11 | 11 |
| Crest Public Utility District | — | — | 13 | 11 |
| National City | 17 | 13 | 11 | 11 |
| Oceanside | 17 | 13 | 11 | 11 |
| San Diego | 17 | 13 | 11 | 11 |
| San Dieguito Irrigation District | — | — | 13 | 12 |
| Santa Fe Irrigation District | — | — | 15 | 13 |

formation. In general the District's annexation charges against newly annexed areas increases with the number of years which have elapsed between the effective date of annexation and the organization date of the District.

In the case of the Authority, the annexation charges are being paid over a thirty-year period beginning, in the case of each agency, with the year following the date of annexation to the District. The figures shown in Table 15, opposite the names of the agencies constituting the Authority, reflect the tax rate which, in each case, has been required to return one-thirtieth of the annexation charge.

Financing

The District's total long-term indebtedness as of June 30, 1950, was \$194,238,500, consisting of outstanding bonds totaling \$180,527,000, and contractual obligations totaling about \$13,711,000. The District has redeemed bonds originally issued for the construction of the Colorado River Aqueduct and distribution system in an amount of \$4,166,000, of which \$2,339,000 matured during the fiscal year 1949-50. The amounts due on contractual obligations at the close of the fiscal year were as follows: (1) \$4,224,000 to the City of Pasadena, in payment for Morris Reservoir; (2) \$6,187,500 (estimated) to the San Diego County Water Authority, in payment

for the northerly one-half of the San Diego Aqueduct; and (3) \$3,300,000 (estimated) to the United States of America, for the construction of the Parker Dam Generating Station.

The total requirements for debt service on the District's outstanding bonds amounted to about \$9,521,030, of which \$2,339,000 was for the retirement of long-term District bonds and the remaining \$7,182,030 for interest charges on the unredeemed bonds.

With current assets of over \$30,000,000, the District's financial position continued to improve during the year. The District has accumulated reserve funds in the amount of about \$29,000,000, most of which are invested in government securities for the principal purpose of meeting the peak requirements for retiring construction bonds and meeting interest payments. During the year, long-term indebtedness decreased by about \$2,600,000, to a total of \$194,238,000. The investment in permanent facilities increased by about \$2,000,000, to a total of \$245,300,000. The District's general balance sheet as of June 30, 1950 is shown in Table 16.

Water Sales

The water diverted from the Colorado River during the fiscal year totaled 181,982 acre-feet, an increase of 11,441 acre-feet, or about 7 per cent over the previous year. Losses in the canals and reservoirs between the river and the most westerly pumping station at Hayfield totaled 14,920 acre-feet, approximately equal to the losses recorded in the previous year.

The water sales to member municipalities during the year totaled 142,244 acre-feet, as compared with 144,880 acre-feet during the previous year. Of this amount, 69,308 acre-feet, or 49 per cent, was sold to the San Diego County Water Authority. The water sales of the District to its member municipalities, and the proportion thereof delivered as softened water, are shown in Table 17.

Water Rates

The base rate for unsoftened water continued during the year at \$8.00 per acre-foot. However, the District Board adopted an ordinance which will increase this rate to \$10.00 per acre-foot, effective July 1, 1950. The additional charge above the base rate for water treated and softened at the La Verne Plant of the District continued

TABLE 16

GENERAL BALANCE SHEET JUNE 30, 1950
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

ASSETS

| | | | |
|---|------------------|------------------|-------------------------|
| <i>Permanent Facilities:</i> | | | |
| Preliminary surveys, engineering and organization expense | | \$ 4,631,317.57 | |
| Original aqueduct construction | \$178,772,262.36 | | |
| Additions and betterments | 7,029,968.88 | | |
| Morris Dam and appurtenant works | 6,311,180.46 | | |
| San Diego Aqueduct (estimated) | 6,500,000.00 | | |
| Parker Power House (estimated) | 3,300,000.00 | 201,913,411.70 | \$206,544,729.27 |
| <i>Other construction costs:</i> | | | |
| Los Angeles | \$ 1,203,778.49 | | |
| Pasadena | 209,737.73 | \$ 1,413,516.22 | |
| Unused power and water to 7/31/41 | 2,790,868.25 | | |
| Bond interest during construction | 34,767,174.97 | \$ 38,971,559.44 | |
| Less interest received on construction funds | | 201,070.37 | 38,770,489.07 |
| Inventories—Operation and Maintenance | | | 243,675.65 |
| <i>Cash:</i> | | | |
| On hand and on deposit | \$ 7,775,335.24 | | |
| Less outstanding demands | 175,649.47 | | 7,599,685.77 |
| <i>Government Securities held</i> | | | |
| <i>Accounts Receivable:</i> | | | |
| Uncollected tax assessments—1949/50 | \$ 414,307.60 | | |
| Uncollected tax assessments—prior years | 355,002.84 | \$ 769,310.44 | |
| Miscellaneous | \$ 328,243.55 | | |
| Cash with employees | 1,500.00 | | |
| Cash deposited with State Compensation Insurance Fund | 500.00 | | |
| Cash deposited with American Airlines, Inc. | 425.00 | | |
| Interest receivable | 32,932.43 | 363,600.98 | 1,132,911.42 |
| <i>Accounts Receivable—Deferred:</i> | | | |
| U. S. Government rate adjustment | \$ 1,202.39 | | |
| Annexation charges (unassessed) | 17,542,926.41 | | 17,544,128.80 |
| | | | <u>\$293,135,619.98</u> |

TABLE 16 (Continued)

GENERAL BALANCE SHEET JUNE 30, 1950
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

LIABILITIES

| | | | |
|---|------------------|------------------|-------------------------|
| <i>Long Term Indebtedness:</i> | | | |
| Outstanding bonds | \$180,527,000.00 | | |
| <i>Contractual Obligation:</i> | | | |
| City of Pasadena | 4,224,000.00 | | |
| San Diego County Water Authority | 6,187,500.00 | | |
| U.S. America—Parker Power House | 3,300,000.00 | | \$194,238,500.00 |
| <i>Accounts Payable Due:</i> | | | |
| Bond interest—coupons not presented | \$ 64,063.75 | | |
| Special deposits | 103,983.32 | | |
| Miscellaneous | 196,392.61 | | 364,439.68 |
| <i>Accrued Bond Interest—Not Due</i> | | | |
| | | | 2,753,714.58 |
| <i>Reserve for Replacements</i> | | | |
| | | | 2,364,644.55 |
| <i>Reserve for Workmen's Compensation and Fire Insurance</i> | | | |
| | | | 91,645.99 |
| <i>Capital Investment:</i> | | | |
| Municipalities: | \$149,931,285.66 | | |
| Withdrawn Cities | 14,079.76 | \$149,945,365.42 | |
| <i>Annexation charges—unassessed</i> | | | |
| | | 17,542,926.41 | |
| | | | \$167,488,291.83 |
| <i>Cumulative Excess of Interest and Other Charges over Revenues:</i> | | | |
| For this fiscal year | \$ 7,672,836.05 | | |
| Prior to this fiscal year | 68,013,534.70 | \$ 75,686,370.75 | \$ 91,801,921.08 |
| <i>Funds Collected and Applied to Construction</i> | | | |
| | | | 1,421,330.69 |
| <i>Work Contributed by Municipalities (connections)</i> | | | |
| | | 99,423.41 | 93,322,675.18 |
| | | | <u>\$293,135,619.98</u> |

TABLE 17
WATER SALES
 by
METROPOLITAN WATER DISTRICT
 To Member Agencies
 Fiscal Years 1941-42 to 1949-50

| Year | Natural Water | | Softened Water | | Total |
|---------------|---------------|----------|----------------|----------|-----------|
| | Acre-feet | Per cent | Acre-feet | Per cent | |
| 1941-42 | 0 | 0 | 9,372.6 | 100 | 9,372.6 |
| 1942-43 | 0 | 0 | 14,457.8 | 100 | 14,457.8 |
| 1943-44 | 0 | 0 | 15,874.9 | 100 | 15,874.9 |
| 1944-45 | 0 | 0 | 30,591.3 | 100 | 30,591.3 |
| 1945-46 | 0 | 0 | 46,685.8 | 100 | 46,685.8 |
| 1946-47 | 0 | 0 | 59,861.8 | 100 | 59,861.8 |
| 1947-48 | 41,093.5 | 36 | 71,995.4 | 64 | 113,088.9 |
| 1948-49 | 71,642.6 | 49 | 73,237.1 | 51 | 144,879.7 |
| 1949-50 | 69,308.0 | 49 | 72,936.0 | 51 | 142,244.0 |

at \$10.00 per acre-foot, making a rate of \$18.00 per acre-foot for softened water furnished by the District to its member municipalities. Because of the authorized increase in the base water rate, this rate for softened water will be increased to \$20.00 per acre-foot on July 1, 1950.

Storage Facilities

Terminal storage for most of the District's corporate area is provided by Lake Mathews, located at the westerly end of the main Colorado River Aqueduct. The San Diego Aqueduct diverts from the Colorado River at the west portal of San Jacinto Tunnel, about 25 miles easterly from this reservoir. A small reservoir located on the San Diego Aqueduct directly below its point of diversion regulates the flow in this line and provides about 1,400 acre-feet of effective storage for the area served by the Authority. The water sold to the Authority is metered at the outlet of this reservoir.

Water Consumption of District Member Municipalities

The total water consumption of member municipalities of the District for the fiscal year 1949-50, including Colorado River water and water produced from other sources, totaled 665,572 acre-feet. This represented an increase of about 6,400 acre-feet over the

TABLE 18
WATER CONSUMPTION—METROPOLITAN WATER DISTRICT CONSTITUENT AREAS

| Constituent Area | Total Water Consumption | | Source of Water Consumed—1949-1950 | | Per cent of total | |
|---------------------------------------|-------------------------|------------------------|------------------------------------|-------------------|-------------------|----------------|
| | 1948-49 amount ac. ft. | 1949-50 amount ac. ft. | M.W.D. | | | |
| | | | Amount ac. ft. | Per cent of total | | Amount ac. ft. |
| Anaheim | 2,713 | 3,041 | 2,853 | 93.8 | 188 | 6.2 |
| Beverly Hills | 10,175 | 9,481 | 514 | 5.4 | 8,967 | 94.6 |
| Burbank | 15,780 | 16,597 | 371 | 2.2 | 16,226 | 97.8 |
| Coastal Municipal Water District .. | 6,950 | 7,298 | 3,302 | 45.2 | 3,996 | 54.8 |
| Compton | 4,234 | 4,283 | 18 | .4 | 4,265 | 99.6 |
| Fullerton | 3,251 | 3,502 | 1,551 | 44.3 | 1,951 | 55.7 |
| Glendale | 20,086 | 19,785 | 33 | .2 | 19,752 | 99.8 |
| Long Beach | 34,270 | 33,959 | 14,170 | 41.7 | 19,789 | 58.3 |
| Los Angeles | 393,527 | 388,981 | 12,648 | 3.3 | 376,333 | 96.7 |
| Pasadena | 23,962 | 24,332 | 18,496 | 76.0 | 5,836 | 24.0 |
| San Diego County Water Auth.* | 83,802 | 90,160 | 56,072 | 62.2 | 34,088 | 37.8 |
| San Marino | 3,673 | 3,967 | — | 0 | 3,967 | 100.0 |
| Santa Ana | 6,666 | 6,973 | 5,236 | 75.1 | 1,737 | 24.9 |
| Santa Monica | 10,402 | 10,651 | 10,465 | 98.3 | 186 | 1.7 |
| Torrance | 3,234 | 3,743 | 1,722 | 46.0 | 2,021 | 54.0 |
| West Basin Municipal Water Dist. | 36,410 | 38,819 | 1,558 | 4.0 | 37,261 | 96.0 |
| Totals | 659,135 | 665,572 | 129,009 | 19.4 | 536,563 | 80.6 |

NOTE: Quantities include total water diverted into agencies' transmission and distribution systems from sources of supply.

* Water use reported by San Diego County Water Authority: Local 34,088 acre-feet, Metropolitan Water District 56,072 acre-feet—total 90,160 acre-feet. The difference between District sales and Authority use of Colorado River water represents water in storage or loss by evaporation.

previous year. The total water consumption of each agency, with a division as to its source, is shown in Table 18.

Quality of Water

The District owns and maintains a 200 c.f.s.-capacity water treatment and softening plant at La Verne, and only treated water is delivered below that point. A laboratory is operated at the plant, where chemical analyses of both raw and treated water are regularly made. The average of such analyses is shown in Table 19.

TABLE 19
ANALYSIS OF COLORADO RIVER WATER—
AVERAGE FOR YEAR ENDING JUNE 30, 1950
(By The Metropolitan Water District of Southern California
at La Verne Treatment Plant)

| Constituent | Symbol | Colorado River Water | |
|----------------------------------|--------------------|----------------------|-----------|
| | | Natural | Softened |
| Silica | SiO ₂ | 8.9 p.p.m. | 13 p.p.m. |
| Iron | Fe | Trace | Trace |
| Calcium | Ca | 81 | 31 |
| Magnesium | Mg | 29 | 12 |
| Sodium and Potassium | Na & K | 101 | 190 |
| Carbonate | CO ₃ | 4 | 11 |
| Bicarbonate | HCO ₃ | 135 | 111 |
| Sulfate | SO ₄ | 295 | 296 |
| Chloride | Cl | 79 | 84 |
| Nitrate | NO ₃ | 0.1 | 0.1 |
| Boron | B | 0.1 | 0.1 |
| Fluoride | F | 0.4 | 0.4 |
| Total dissolved solids | | 666 | 693 |
| Hardness as CaCO ₃ | | | |
| Total | | 321 | 127 |
| Carbonate | | 117 | 109 |
| Noncarbonate | | 204 | 18 |
| Free carbon dioxide | CO ₂ | 0 | 0 |
| Hydrogen ion concentration | pH | 8.4 | 8.9 |
| Electrical conductivity | ECX10 ⁶ | 1035 | 1100 |

The water supplied to the San Diego Aqueduct is natural Colorado River water which has not been stored in Lake Mathews. Because of this fact, the chemical analysis is slightly different from that of the natural waters at the La Verne Treatment Plant. The average monthly analyses made on samples of water taken at the entrance to the San Diego Aqueduct during the fiscal year, are shown in Table 20.

TABLE 20
ANALYSIS OF COLORADO RIVER AQUEDUCT WATER
TAKEN AT WEST PORTAL OF SAN JACINTO TUNNEL
For Year Ending June 30, 1950

| Constituent | Symbol | Average | Analyses | |
|----------------------------------|---------------------------|-------------|-------------|-------------|
| | | | Maximum | Minimum |
| Silica | SiO ₂ | 10.1 p.p.m. | 11.8 p.p.m. | 8.9 p.p.m. |
| Iron | Fe | Trace | .12 | 0 |
| Calcium | Ca | 77 | 81 | 74 |
| Magnesium | Mg | 24 | 27 | 23 |
| Sodium | Na | 85 | — | — |
| Potassium | K | 4 | — | — |
| Carbonate | CO ₃ | 4 | 7 | 0 |
| Bicarbonate | HCO ₃ | 139 | 148 | 127 |
| Sulphate | SO ₄ | 254 | 273 | 235 |
| Chloride | Cl | 66 | 73 | 61 |
| Nitrate | NO ₃ | .1 | 1.3 | 0.7 |
| Boron | | 0.1 | — | — |
| Fluoride | | 0.4 | — | — |
| Total dissolved solids | | 594 | 626 | 552 |
| Hardness as CaCO ₃ | | | | |
| Total | | 291 | 309 | 277 |
| Carbonate | | 120 | 125 | 112 |
| Noncarbonate | | 171 | 187 | 159 |
| Free carbon dioxide | CO ₂ | 0 | 1 | 0 |
| Hydrogen ion concentration | pH | 8.3 | 8.4 at 24°C | 8.2 at 26°C |
| Electrical conductivity | ECX10 ⁶ @ 25°C | 930 | 993 | 821 |

NOTE: For analyses of monthly samples, see table 11.



Constructing first barrel of Aqueduct near Temecula

SECTION V

LEGAL

THE work of the Authority's General Counsel continued in the main to consist of advice to and cooperation with the members of the staff and committees of the Board of Directors. No litigation developed during the year, but considerable time and thought was devoted to legislative matters, particularly in the study of the legislative approach to the ultimate construction of the second barrel and in connection with possible changes in the Water Authority Act which would make possible the elimination of the vexing problems resulting from territory overlapped by two or more member agencies.

A number of possible annexations were studied and proceedings were commenced for the annexation of a substantial acreage to the Fallbrook Public Utility District, and for the annexation of the corporate area of the City of Escondido as a separate member agency. In addition, the Authority had under consideration the application of the Carlsbad Public Utility District, formed during the year, and the possibility of the formation of public agencies in the El Cajon Valley and South Bay areas of San Diego County, which it is expected will result in applications for annexation of the area incorporated in such public agencies. As the procedure for the annexation of areas to the Authority, other than by annexation to a city member, is quite complicated, the General Counsel worked closely with attorneys representing areas seeking annexation, in order that the procedure followed would meet all legal requirements in the event that the area was found to be acceptable by the Boards of Directors of the Authority and the Metropolitan Water District.

A source of frequent concern to the Authority was the annexation to city members which resulted in automatic annexation of the territory added to the cities, to the Water Authority and the Metropolitan Water District. The rapidity with which member cities are expanding results in constant changes in the boundaries of the Authority

and the Metropolitan Water District, over which neither the Authority nor the District has any control and regarding which neither organization has any knowledge until the annexation is reported. As the officials of the member cities become more acquainted with the Authority procedure, the confusion resulting from annexations is decreasing. However, as the annexed territory becomes thereafter subject to taxation by the Authority and by the Metropolitan Water District, counsel for both organizations must scrutinize with care the procedure followed for the annexations, to determine whether or not all legal requirements, particularly those pertaining to the resultant change in the boundaries, have been fully and technically complied with.

Another confusing result from uncontrolled annexations is that of overlapping areas, where a portion of the area of a district member annexes directly to a city member without withdrawing from or being excluded from the boundaries of the district member. There is no inconsistency, under the laws governing the formation and operation of an irrigation district, in an area within an irrigation district to be located also within the boundaries of a corporate city. In a number of instances lands lying within an irrigation district member of the Authority have been subsequently annexed to a neighboring city without withdrawing from the member district, which has resulted in land being within the corporate limits of two member agencies. The effect of this situation is to leave uncertain the member agencies in which the land is to be considered for Authority purposes. Some of the member cities of the Authority pay all or a portion of the annual assessment levied by the Metropolitan Water District in cash to that organization, while other members permit the same to be collected by means of a tax levy upon their taxable property. Where land lies within the boundaries of two member agencies, one of which pays its entire assessment in cash, while the other permits it to be levied in the form of a tax against the property, a serious question arises as to whether the cash payment should include the assessment upon the overlapped area or

whether such area should be included within the agency upon which a tax is levied.

In attempting to solve this problem, the officials of the affected agencies were consulted, and the Authority was advised that if possible the overlapped territory should be included for Authority and Metropolitan Water District purposes as being within the agency supplying such area with water. As there was no provision in the Authority Act covering such situations, it appeared necessary to amend the Act to accomplish the desired result, and considerable study was given to a possible amendment to the Water Authority Act. In this connection, Counsel for the Metropolitan Water District, the San Diego County Counsel, and the City Attorney of the City of San Diego have given invaluable advice to the General Counsel.

During the year, the consideration of legislation which might become necessary to authorize the construction of the second barrel to the San Diego Aqueduct continued to be of concern to the General Counsel, as were also the provisions of the agreements under which the Authority is in possession of the Aqueduct, and particularly their effect on the possible construction of the second barrel separately by the Authority within the Government's right of way and as a part of the permanent Aqueduct structure. Counsel participated in conferences with representatives of the U. S. Department of Justice (Attorney General's Office) and of the Public Works Department of the Eleventh Naval District, in reference to the final acquisition of rights of way for the Aqueduct and the conflict in interests in locations where the Aqueduct right of way crossed or traversed State highway routes. As the solution of these problems permanently affect the Authority in the operation, maintenance, enlargement or replacement of the Aqueduct when it becomes the property of the Authority, it is essential to participate in all such matters.

A number of minor contracts, ordinance changes, et cetera, were negotiated during the year; the most important of which resulted in a contract with the City of San Diego providing for Authority

storage in San Vicente Reservoir. This required the establishment of a new water rate covering the delivery of stored water in order to reimburse the Authority for its additional cost. Since storing of water was a new experience for the Authority, it later developed that certain changes might be necessary in the method of operation, and in the original rate established for stored water. This and other continuing matters were under consideration by the General Counsel in collaboration with the members of the Authority staff as the year drew to a close.

SECTION VI FINANCIAL

WHILE the 71-mile San Diego Aqueduct was directly financed by the Federal Government, the 31-mile distribution system was financed by an Authority bond issue. The cost of the Aqueduct, estimated at about \$14,000,000, is being repaid without interest in accordance with the terms of the Authority-Navy lease-purchase contract which provides for payments at an annual rate of \$500,000 after its true cost has been determined. Pending the settlement of certain rights of way and construction claims, the true cost of the main aqueduct remains undetermined, and payments therefor to the United States are being made under the terms of a supplemental agreement at the annual rate of \$250,000.

The funds required for the construction of the distribution system were raised by the sale of a \$2,000,000 bond issue, maturing serially over a 19-year period, beginning January 1, 1953 and ending January 1, 1971. The average interest rate on this issue is 2.19 per cent. The average annual amount required for funding interest and principal over the 25 year life of the issue is \$106,000. Table 29 shows the funds required annually to meet interest payments and retire bonds at maturity dates.

Under the terms agreed upon for annexing the corporate area of the Authority to the Metropolitan Water District, the District will pay the Authority one-half of the construction cost of the Aqueduct, as determined by the U. S. Navy Department, and is currently paying the Authority \$125,000 per year for that purpose.

From the above, it can be readily determined that the total annual requirements for meeting the Authority's obligations resulting from the construction of the San Diego Aqueduct and its distribution lines, currently amount to about \$231,000, and that this sum will be increased to about \$356,000 when the Aqueduct is formally completed and its true cost determined.

The cost of operating and maintaining the Authority water system during the fiscal year 1949-50 was about \$90,000, which is being met primarily with revenues received from the sale of water. During the same period, the cost of new construction work and related capitalized items amounted to about \$15,000.

At the end of the fiscal year the current assets amounted to \$1,177,950, an increase of \$258,428 over the previous year. The total accumulated reserves and unappropriated surplus amounted to \$1,126,113, of which \$701,564 was invested in government securities.

In general, the Authority's financial operations have continued to be carried out in accordance with the policy of the Board of Directors, adopted on May 12, 1949 and described in detail in the Third Annual Report. Briefly, this policy involved the funding of the long-term obligations with their varying annual requirements in order to stabilize the tax levies in such a manner as to make possible a steady or declining tax rate. It also involved the carrying over of existing surpluses in the General Fund from year to year for the purpose of stabilizing the fluctuations in the revenues received from the sale of water, which will vary with the weather cycles, in order that over the long-range period the funds derived from the sale of water may be expected to meet the cost of operation and maintenance without levying taxes for that purpose.

The financial operations of the Authority are summarized in Tables 21 to 29, appearing in the following pages of this section.

All accounts have been regularly audited by Everts and Esenoff, Certified Public Accountants, and their statement covering their examination of Authority records appears on Page 74.

TABLE 21
STATEMENT OF INCOME AND EXPENSE
July 1, 1949 to June 30, 1950

| | | |
|---|--------------|----------------|
| OPERATING INCOME | | |
| Water revenues | | \$585,213.80 |
| <i>Deduct Operating Costs</i> | | |
| Cost of water sold: | | |
| Water purchased | \$554,464.00 | |
| Less inventory of water in storage | 83,551.20 | \$470,912.80 |
| | | <hr/> |
| Direct operating expense (Field & Office) | | 51,715.65 |
| General and administrative expense | | 38,910.47 |
| | | <hr/> |
| Total Operating Expense | | 561,538.92 |
| | | <hr/> |
| NET OPERATING INCOME BEFORE DEPRECIATION AND DEBT SERVICE EXPENSE | | |
| | | 23,674.88 |
| <i>Deduct Depreciation and Debt Service Expense:</i> | | |
| Depreciation | 95,203.99 | |
| Debt service expense | 40,948.75 | 136,152.74 |
| | | <hr/> |
| <i>Net Operating Income (Deficit)....</i> | | (112,477.86) |
| INCOME CREDITS: | | |
| Revenue from taxes | 72,625.37 | |
| Less collection expense | 145.94 | 72,479.43 |
| | | <hr/> |
| Miscellaneous revenues | 3,270.20 | 75,749.63 |
| | | <hr/> |
| Net Income (Deficit) for the Year to Surplus | | (\$ 36,728.23) |

TABLE 21

STATEMENT OF FINANCIAL POSITION—JUNE 30, 1950

| ASSETS | | |
|--|--------------|------------------------|
| CURRENT ASSETS: | | |
| Cash with treasurer | \$ 1,991.27 | |
| Petty cash | 100.00 | |
| Accounts receivable | 52,025.10 | |
| Accrued interest receivable | 386.07 | |
| Delinquent taxes receivable | \$ 2,076.52 | |
| Less allowance for estimated losses | 2,076.52 | |
| Inventory—water in storage | 83,551.20 | |
| Investments | 219,509.33 | |
| Total Current Assets | | \$ 357,562.97 |
| Annexation charges receivable—not due | | 22,635.62 |
| BOND INTEREST AND SINKING FUND: | | |
| Cash with treasurer | 67,619.11 | |
| Special deposits for payment of bond interest | 20,495.00 | |
| Accounts receivable | 4,527.02 | |
| Accrued interest receivable | 321.66 | |
| Delinquent taxes receivable | 3,158.87 | |
| Less allowance for estimated losses | 3,158.87 | |
| Investments | 221,854.59 | |
| Total Bond Interest and Sinking Fund | | 314,817.38 |
| U. S. GOVERNMENT CONTRACT FUND: | | |
| Cash with treasurer | 84,549.49 | |
| Accounts receivable | 10,563.04 | |
| Accrued interest receivable | 257.44 | |
| Delinquent taxes receivable | 7,816.93 | |
| Less allowance for estimated losses | 7,816.93 | |
| Investments | 260,199.68 | |
| Due from Metropolitan Water District | 6,187,500.00 | |
| Total U. S. Government Contract Fund | | 6,543,069.65 |
| GENERAL RESERVE FUND: | | |
| Cash with treasurer | | 150,000.00 |
| OTHER ASSETS: | | |
| Cost of participation rights in Metropolitan Water District to June 30, 1950 | | 16,789,002.21 |
| FIXED ASSETS: | | |
| San Diego Aqueduct—est. Authority cost | 6,500,000.00 | |
| La Mesa-Sweetwater Extension | 1,465,657.30 | |
| Fallbrook-Oceanside Branch | 833,782.70 | |
| Escondido Headquarters | 24,911.22 | |
| Furniture and fixtures | 4,525.45 | |
| Office equipment | 6,135.89 | |
| Engineering equipment | 730.00 | |
| Automotive equipment | 22,996.49 | |
| Miscellaneous equipment | 2,347.76 | |
| | 8,861,086.81 | |
| Less allowance for depreciation | 187,170.48 | |
| Construction work in progress | 64,049.34 | |
| Total Fixed Assets—net book value | | 8,737,965.67 |
| | | <u>\$32,915,053.50</u> |

TABLE 22 (Continued)

STATEMENT OF FINANCIAL POSITION—JUNE 30, 1950

| LIABILITIES, RESERVES AND EQUITY ACCOUNTS | | |
|---|---------------|------------------------|
| CURRENT LIABILITIES: | | |
| Accounts payable | \$ 3,000.00 | |
| Matured bond interest coupons payable | 20,495.00 | |
| Purchase order encumbrances | 48.62 | |
| Total Current Liabilities | | \$ 20,843.62 |
| LONG TERM OBLIGATIONS: | | |
| Bonds payable—not due | 2,000,000.00 | |
| U. S. Government Contract payable | 12,375,000.00 | |
| Annexation charges due Metropolitan Water District | 12,069,327.89 | |
| Total Long Term Obligations | | 26,444,327.89 |
| Total Liabilities | | 26,465,171.51 |
| RESERVES: | | |
| For Petty cash | 100.00 | |
| For annexation charges receivable—not due | 22,635.62 | |
| For retirement of sinking fund bonds | \$ 260,869.56 | |
| For amount available for reduction of taxes | 33,452.82 | 294,322.38 |
| For payments on U. S. Government Contract | 355,569.65 | |
| Total Reserves | | 672,627.65 |
| GENERAL RESERVE FUND BALANCE | | 150,000.00 |
| EQUITY ACCOUNTS: | | |
| <i>Investment in Fixed Assets:</i> | | |
| Financed from bond funds | 1,848,335.19 | |
| Financed from U. S. Government Contract | 6,500,000.00 | |
| Financed from agencies' payments to Metropolitan Water District | 4,719,674.32 | |
| Financed from current revenues | 315,540.74 | |
| Financed from agencies' contributions for special construction | 10,040.40 | |
| Construction work in progress | 64,049.34 | 13,457,639.99 |
| <i>Less:</i> | | |
| Amount available for retirement of U. S. Government Contract | 355,569.65 | |
| Amount required for retirement of U. S. Government Contract | 5,831,930.35 | |
| Bonds payable—not due | 2,000,000.00 | 8,187,500.00 |
| Total Equity Accounts—Net | | 5,270,139.99 |
| APPROPRIATED SURPLUS (Continuing Appropriations) | | 30,992.26 |
| UNAPPROPRIATED SURPLUS | | 326,122.09 |
| | | <u>\$32,915,053.50</u> |

TABLE 23
STATEMENT OF REVENUE—ESTIMATED AND ACTUAL—
ALL FUNDS
Fiscal Year Ended June 30, 1950

| | Estimated Revenue | Actual Revenue | Excess or Deficiency* of Actual over Estimated |
|---|---------------------|-----------------------|--|
| GENERAL FUND | | | |
| Taxes, secured, current levy | \$ 3,300.00 | \$ 3,303.93 | \$ 3.93 |
| Taxes, unsecured, current levy | 22,800.00 | 23,056.55 | 256.55 |
| Taxes, secured, prior years' levies | — | 4,844.74 | 4,844.74 |
| Taxes, unsecured, prior years' levies | — | (Cr) 213.09 | 213.09* |
| Penalties and interest on delinquent taxes | — | 415.82 | 415.82 |
| Miscellaneous tax on options | — | 3.91 | 3.91 |
| Receipts in lieu of taxes | — | 327.72 | 327.72 |
| Sale of water | 510,000.00 | 585,213.80 | 75,213.80 |
| Miscellaneous tax sales | — | 135.79 | 135.79 |
| Earnings on bank deposits | — | 821.10 | 821.10 |
| Earnings on investments | 3,000.00 | 1,049.10 | 1,950.90* |
| Rentals | 1,200.00 | 1,200.00 | — |
| Miscellaneous revenues | 1,000.00 | 200.00 | 800.00* |
| Total—General Fund | \$541,300.00 | \$ 620,359.37 | \$79,059.37 |
| BOND INTEREST & SINKING FUND | | | |
| Taxes, secured, current levy | \$ 96,500.00 | \$ 96,527.22 | \$ 27.22 |
| Taxes, unsecured, current levy | 9,100.00 | 9,222.87 | 122.87 |
| Taxes, secured, prior years' levies | — | 1,953.63 | 1,953.63 |
| Taxes, unsecured, prior years' levies | — | (Cr) 74.69 | 74.69* |
| Penalties and interest on delinquent taxes | — | 264.00 | 264.00 |
| Miscellaneous tax on options | — | 2.03 | 2.03 |
| Receipts in lieu of taxes | 2,000.00 | 4,733.58 | 2,733.58 |
| Miscellaneous tax sales | — | 54.32 | 54.32 |
| Earnings on investments | 2,400.00 | 874.13 | 1,525.87* |
| Total—Bond Interest & Sinking Fund | \$110,000.00 | \$ 113,557.09 | \$ 3,557.09 |
| U. S. CONTRACT FUND | | | |
| Taxes, secured, current levy | \$224,900.00 | \$ 224,930.17 | \$ 30.17 |
| Taxes, unsecured, current levy | 31,800.00 | 32,279.35 | 479.35 |
| Taxes, secured, prior years' levies | — | 6,438.33 | 6,438.33 |
| Taxes, unsecured, prior years' levies | — | (Cr) 163.56 | 163.56* |
| Penalties and interest on delinquent taxes | — | 742.61 | 742.61 |
| Miscellaneous tax on options | — | 6.59 | 6.59 |
| Receipts in lieu of taxes | 8,000.00 | 11,197.94 | 3,197.94 |
| Miscellaneous tax sales | — | 190.09 | 190.09 |
| Earnings on investments | 2,000.00 | 699.53 | 1,300.47* |
| Total—U. S. Contract Fund | \$266,700.00 | \$ 276,321.05 | \$ 9,621.05 |
| Total All Funds | \$918,000.00 | \$1,010,237.51 | \$92,237.51 |

TABLE 24
STATEMENT OF APPROPRIATIONS AND EXPENDITURES
July 1, 1949 to June 30, 1950

| | Prior Year Appropriations Carried Over | Appropriations 1949-50 | Expenditures 1949-50 | Cancelled Appropriations | Unexpended Appropriations June 30, 1950 |
|---|--|------------------------|----------------------|--------------------------|---|
| 101—San Diego Aqueduct | \$ 1,360.26 | | | | \$ 1,360.26 |
| 105—Construction of Maintenance Headquarters—Escondido | 395.98 | | \$ 229.40 | \$ 166.58 | |
| 110—Construction of Access Roads | 10,128.89 | | 6,933.28 | | 3,195.61 |
| 112—Preliminary Investigation (2nd Barrel) Completion of San Diego Aqueduct | 26,441.65 | | 5.26 | | 26,436.39 |
| 113—Lakeside Irrigation District Service Line | 3,000.00 | | 3,000.00 | | |
| 109—Construction of Additional Outlet Lake Hodges | 16,644.60 | | | 16,644.60 | |
| 111—Construction of Additional Outlet Fallbrook-Oceanside Branch | 3,754.11 | | 1,913.27 | 3,754.11 | |
| Less Refunds | | \$ 97,280.00 | (1,913.27) | 7,701.09 | |
| 114—Operation and Maintenance | | 560,000.00 | 554,464.00 | 5,536.00 | |
| 115—Purchase of Water from Metropolitan Water District | | 125,000.00 | 125,000.00 | | |
| 116—Payments to U. S. Government on Lease-Purchase of Aqueduct | | 40,750.00 | 40,750.00 | | |
| 117—Bond Interest Coupons Redemptions | | 3,246.00 | 3,246.00 | | |
| Protection of Water Rights | | | | | |
| Total | \$61,725.49 | \$826,276.00 | \$823,206.85 | \$33,802.38 | \$30,992.26 |

TABLE 25
SUMMARY STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS
Fiscal Year Ended June 30, 1950

| | Cash Balance July 1, 1949 | Cash Receipts | Inter-Fund Transfers | | Cash Disbursements | Cash Balance June 30, 1950 |
|------------------------------------|------------------------------|-----------------------|----------------------|--------------------|-----------------------|-------------------------------|
| | | | In | Out | | |
| General Fund | \$232,717.04 | \$ 757,718.75 | \$30,000.00 | \$58,183.16 | \$ 960,261.36 | \$ 1,991.27 |
| Bond Interest & Sinking Fund | 220,140.05 | 171,775.88 | 6,301.38 | | 330,598.20 | 67,619.11 |
| U. S. Contract Fund | 202,763.63 | 424,501.76 | 26,881.78 | 5,000.00 | 564,597.68 | 84,549.49 |
| General Reserve Fund | 150,000.00 | | 35,000.00 | 35,000.00 | | 150,000.00 |
| Total—All Funds | \$805,620.72 | \$1,353,996.39 | \$98,183.16 | \$98,183.16 | \$1,855,457.24 | \$304,159.87 |

TREASURY CASH ON DEPOSIT JUNE 30, 1950

| | |
|--|---------------------|
| First National Trust and Savings Bank | \$322,435.84 |
| Bank of America National Trust and Savings Association | 70,495.00 |
| Total Bank Balances | \$392,930.84 |
| Deposit in Transit | 2,211.87 |
| Less: Outstanding Warrants | \$395,142.81 |
| Special Deposit for payment of Bond Interest Coupons | \$70,487.84 |
| Treasury Cash June 30, 1950 | 90,982.84 |
| Treasury Cash June 30, 1950 | \$304,159.87 |

TABLE 26
STATEMENT OF TAX ASSESSMENTS AND COLLECTIONS
as of June 30, 1950

| Member Agency | Tax Assessments to Date | Adjustments Tax Assessments | Tax Collections | Interest and Penalties | Tax on Options | Receipts in Lieu of Taxes | Misc. Tax Sales | Less Refunds | Net Total Collections | Uncollected 6-30-50 |
|---|-------------------------|-----------------------------|-----------------------|------------------------|----------------|---------------------------|-----------------|-------------------|-----------------------|---------------------|
| | | | | | | | | | | |
| Fallbrook Public Utility District | 9,808.19 | 4.25 | 9,481.60 | 32.56 | .24 | 314.26 | | 3.37 | 9,825.29 | 330.84 |
| Lakeside Irr. District | 2,338.62 | 29.71 | 2,274.33 | 12.08 | .05 | | | 2.16 | 2,296.92 | 94.00 |
| La Mesa, Lemon Grove & Spring Valley I.D. | 111,261.23 | 87.68 | 109,598.98 | 402.07 | 45.85 | | | 64.78 | 110,037.25 | 1,750.96 |
| National City | 39,508.04 | 44.74 | 38,942.42 | 126.80 | 4.84 | 2,768.17 | | 51.18 | 41,801.92 | 610.36 |
| Oceanside | 33,849.50 | 42.37 | 33,241.65 | 86.53 | 5.11 | 2,279.30 | | 56.31 | 35,556.28 | 650.22 |
| San Diego | 1,207,289.19 | 1,557.81 | 1,200,410.77 | 2,177.61 | 19.46 | 65,832.95 | | 1,877.77 | 1,266,864.66 | 8,436.23 |
| Santa Fe Irr. District | 4,963.19 | | 4,685.31 | 9.20 | | | | | 4,694.51 | 279.88 |
| San Dieguito Irrigation District | 6,467.81 | | 6,184.08 | 9.60 | | | | | 6,193.68 | 283.73 |
| Total Member Agencies | \$1,463,538.32 | \$1,805.97 | \$1,452,293.18 | \$2,981.41 | \$75.89 | \$73,684.29 | \$380.26 | \$2,086.68 | \$1,527,328.35 | \$13,051.31 |
| *Withdrawn Agencies | 4,129.14 | 20.59 | 4,148.72 | 8.15 | .15 | 186.64 | | | 4,343.66 | 1.01 |
| Total | \$1,467,667.66 | \$1,826.56 | \$1,456,441.90 | \$2,989.56 | \$76.04 | \$73,870.93 | \$380.26 | \$2,086.68 | \$1,531,672.01 | \$13,052.32 |

* Coronado 5/10/46.
Ramona Irrigation District 8/21/46.

COLLECTION EXPENSE—COUNTY OF SAN DIEGO

| | |
|---------------------------|-----------|
| Fiscal Year 1945-46 | \$ 439.40 |
| 1946-47 | 471.12 |
| 1947-48 | 1,147.44 |
| 1948-49 | 1,550.04 |
| 1949-50 | 1,205.09 |

TABLE 27
STATUS OF TAX COLLECTIONS
July 1, 1945 to June 30, 1950

| Fiscal Year | Tax Assessments | Collected during Fiscal Year | Uncollected at end of Fiscal Year | Per Cent Uncollected | Subsequent Cancellations and Additions | Subsequent Collections | Unpaid as of June 30, 1950 |
|-------------|-----------------|------------------------------|-----------------------------------|----------------------|--|------------------------|----------------------------|
| 1945-46 | \$ 96,131.33 | \$ 94,656.51 | \$ 1,474.82 | 1.53 | \$128.57 | \$ 1,515.31 | \$ 88.08 |
| 1946-47 | 107,808.89 | 105,753.78 | 2,055.11 | 1.90 | 201.01 | 1,982.21 | 273.91 |
| 1947-48 | 389,591.57 | 381,563.14 | 8,028.43 | 2.06 | | 6,847.80 | 1,180.63 |
| 1948-49 | 474,520.78 | 459,504.39 | 15,016.39 | 3.16 | | 11,886.61 | 3,129.78 |
| 1949-50 | 401,112.07 | 392,732.15 | 8,379.92 | 2.21 | | | 8,379.92 |

TABLE 28
AUTHORITY ASSESSED VALUATIONS AND TAX RATES

| Fiscal Year | Secured | | Public Utilities | Unsecured Personal | Total | Tax Rate per \$100 | |
|-------------|--------------------|-----------------|------------------|--------------------|--------------------|--------------------|-----------|
| | Real Personal | Personal | | | | Secured | Unsecured |
| 1945-46 | \$212,082,975.00 | \$28,253,700.00 | | \$29,960,130.00 | \$270,296,805.00 | \$0.04 | \$0.00 |
| 1946-47 | 208,715,150.00 (1) | 29,433,450.00 | | 30,665,910.00 | 268,814,510.00 | 0.04 | 0.04 |
| 1947-48 | 233,579,990.00 | 32,740,680.00 | | 40,977,850.00 | 307,298,520.00 (2) | 0.14 | 0.04 |
| 1948-49 | 254,227,570.00 | 37,482,020.00 | | 47,177,300.00 | 338,886,890.00 | 0.14 | 0.14 |
| 1949-50 | 290,351,875.00 | 42,429,140.00 | | 45,743,200.00 | 378,524,215.00 | 0.10 | 0.14 |

Debt limit 15 per cent of last equalized assessed valuation of Authority.
Basis of assessment approximately 50 per cent.

(1) City of Coronado and Ramona Irrigation District secured assessed valuation not included in this or subsequent tax levies by the Authority, they having withdrawn from the Authority prior to 1946-47.

(2) City of Coronado and Ramona Irrigation District not included in this or subsequent total valuation.

TABLE 29
SCHEDULE OF BONDED DEBT AND ANNUAL REQUIREMENTS

| Fiscal Year | Interest Payable (1) | Bond Principal Payable (2) | Total Cash Required |
|-------------|----------------------|----------------------------|---------------------|
| 1946-47 | \$ 20,375.00 | \$ | \$ 20,375.00 |
| 1947-48 | 40,750.00 | | 40,750.00 |
| 1948-49 | 40,750.00 | | 40,750.00 |
| 1949-50 | 40,750.00 | | 40,750.00 |
| 1950-51 | 40,750.00 | | 40,750.00 |
| 1951-52 | 40,750.00 | | 40,750.00 |
| 1952-53 | 40,125.00 | 50,000.00 | 90,125.00 |
| 1953-54 | 38,875.00 | 50,000.00 | 88,875.00 |
| 1954-55 | 37,625.00 | 50,000.00 | 87,625.00 |
| 1955-56 | 36,500.00 | 50,000.00 | 86,500.00 |
| 1956-57 | 35,000.00 | 100,000.00 | 135,000.00 |
| 1957-58 | 33,000.00 | 100,000.00 | 133,000.00 |
| 1958-59 | 31,000.00 | 100,000.00 | 131,000.00 |
| 1959-60 | 29,000.00 | 100,000.00 | 129,000.00 |
| 1960-61 | 27,000.00 | 100,000.00 | 127,000.00 |
| 1961-62 | 24,500.00 | 150,000.00 | 174,500.00 |
| 1962-63 | 21,500.00 | 150,000.00 | 171,500.00 |
| 1963-64 | 18,500.00 | 150,000.00 | 168,500.00 |
| 1964-65 | 15,500.00 | 150,000.00 | 165,500.00 |
| 1965-66 | 12,500.00 | 150,000.00 | 162,500.00 |
| 1966-67 | 9,500.00 | 150,000.00 | 159,500.00 |
| 1967-68 | 7,000.00 | 100,000.00 | 107,000.00 |
| 1968-69 | 5,000.00 | 100,000.00 | 105,000.00 |
| 1969-70 | 3,000.00 | 100,000.00 | 103,000.00 |
| 1970-71 | 1,000.00 | 100,000.00 | 101,000.00 |
| | \$650,250.00 | \$2,000,000.00 | \$2,650,250.00 |

(1) Interest rate on bonds maturing in 1953 to 1955 inclusive is 2½%; 1956 to 1971 inclusive 2%; payable January 1 and July 1.

(2) Maturity day, January 1.

EVERTS and ESENOFF
Certified Public Accountants
Suite 726, First National Building
San Diego, California

September 15, 1950

Board of Directors
San Diego County Water Authority
314-321 Land Title Building
San Diego 1, California

Gentlemen:

We have examined the financial records of the San Diego County Water Authority covering the period beginning July 1, 1949 and ending June 30, 1950. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion the accompanying balance sheet and statement of income and surplus present fairly the financial position of the San Diego County Water Authority at June 30, 1950 and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Yours very truly,

(signed) CHAS. C. PORTER

For Everts and Esenoff
Certified Public Accountants