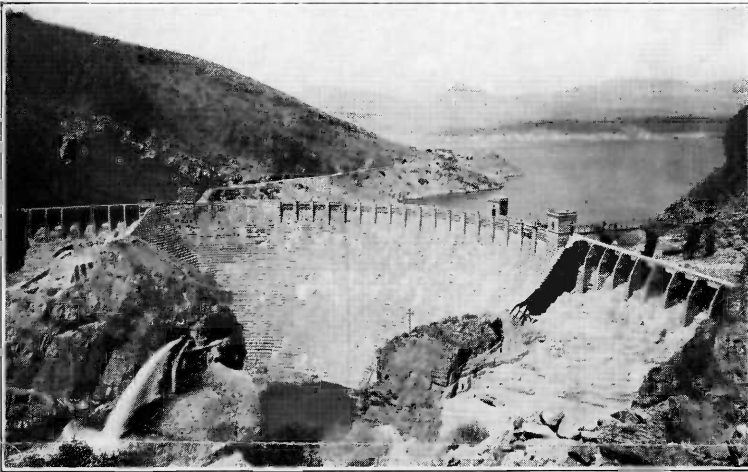


The Salt River Project, Arizona

Operated by the
Salt River Valley Water Users' Association



ROOSEVELT DAM AND POWER PLANT
(latter nearly hidden by cliff).
Begun in 1906—completed 1911. Additions to dam
and power plant begun 1923 and completed 1924.

Spillways lowered 6 ft., 1936.

Type, gravity, arched form, rubble.

Length over all, ft.....	1,125
Elevation top (coping) above sea, ft.....	2,146
Height from bed rock, ft.....	284
Thickness at base, ft.....	184
Thickness at top, ft.....	16

RESERVOIR: (*Spillway Lowered 6 ft. in 1937*)

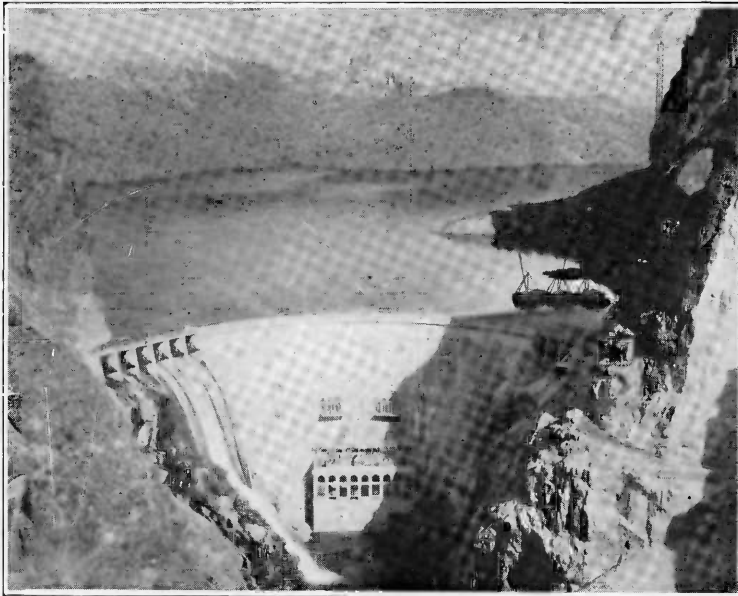
Capacity, ac. ft.....	1,522,000
Area, acres.....	17,800
Length, miles.....	23

Drainage area, square miles.....	5,760
Spillway capacity, sec. ft.....	150,000
POWER PLANT: Capacity, H. P.....	24,000

Head ft.....112 to 228.5

MASONRY: In dam (1923) cu. yds.... 342,376

COST: Dam and plant, 1927.....\$5,442,000



HORSE MESA DAM AND POWER PLANT

Begun 1924—Completed 1927

Additional spillway provided 1936-37.

Type, variable-radius arch, concrete.

Length over all, ft.....	784
Elevation top (coping) above sea, ft.....	1,920
Height from bed rock, ft.....	305
Thickness at base, ft.....	57
Thickness at top, ft.....	8

RESERVOIR: Capacity, ac. ft..... 245,000

Area, acres.....	2,600
Length, miles.....	17

Drainage area, square miles.....	110
Spillway capacity, sec. ft.....	150,000
POWER PLANT: Capacity, H. P.....	43,000

Head ft.....266

CONCRETE: In dam (1927) cu. yds.... 147,357

COST: Dam and plant, 1927.....\$4,237,000



MORMON FLAT DAM AND POWER PLANT

Dam begun 1923 and completed 1925. Power plant
begun 1925 and completed 1926.

Spillway reconstructed 1937.

Type, variable-radius arch, concrete.

Length, over all, ft.....	623
Elevation, top (coping) above sea, ft....	1,671
Height from bed rock, ft.....	229
Thickness at base, ft.....	20
Thickness at top, ft.....	8

RESERVOIR: Capacity, ac. ft..... 63,200

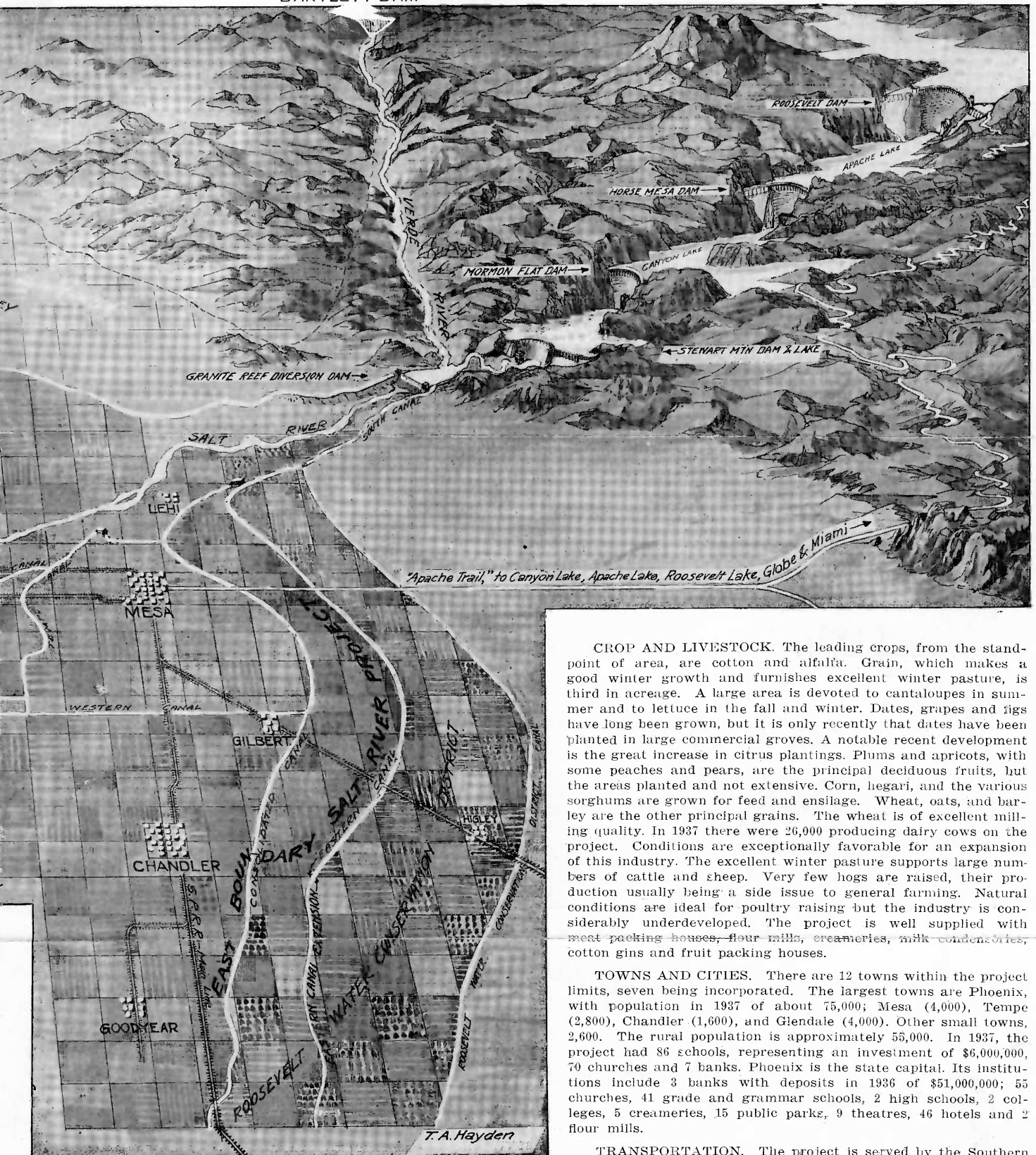
Area, acres.....	63,200
Length, miles.....	10

Drainage area, square miles.....	160
Spillway capacity, sec. ft.....	150,000
POWER PLANT: Capacity, H. P.....	10,000

Head ft.....147

CONCRETE: In dam (1926) cu. yds.... 42,980

COST: Dam and plant, 1927.....\$1,559,000



CROP AND LIVESTOCK. The leading crops, from the standpoint of area, are cotton and alfalfa. Grain, which makes a good winter growth and furnishes excellent winter pasture, is third in acreage. A large area is devoted to cantaloupes in summer and to lettuce in the fall and winter. Dates, grapes and figs have long been grown, but it is only recently that dates have been planted in large commercial groves. A notable recent development is the great increase in citrus plantings. Plums and apricots, with some peaches and pears, are the principal deciduous fruits, but the areas planted and not extensive. Corn, legari, and the various sorghums are grown for feed and ensilage. Wheat, oats, and barley are the other principal grains. The wheat is of excellent milling quality. In 1937 there were 26,000 producing dairy cows on the project. Conditions are exceptionally favorable for an expansion of this industry. The excellent winter pasture supports large numbers of cattle and sheep. Very few hogs are raised, their production usually being a side issue to general farming. Natural conditions are ideal for poultry raising but the industry is considerably underdeveloped. The project is well supplied with meat packing houses, flour mills, creameries, milk condenseries, cotton gins and fruit packing houses.

TOWNS AND CITIES. There are 12 towns within the project limits, seven being incorporated. The largest towns are Phoenix, with population in 1937 of about 75,000; Mesa (4,000), Tempe (2,800), Chandler (1,600), and Glendale (4,000). Other small towns, 2,600. The rural population is approximately 55,000. In 1937, the project had 86 schools, representing an investment of \$6,000,000, 70 churches and 7 banks. Phoenix is the state capital. Its institutions include 3 banks with deposits in 1936 of \$51,000,000; 55 churches, 41 grade and grammar schools, 2 high schools, 2 colleges, 5 creameries, 15 public parks, 9 theatres, 46 hotels and 2 flour mills.

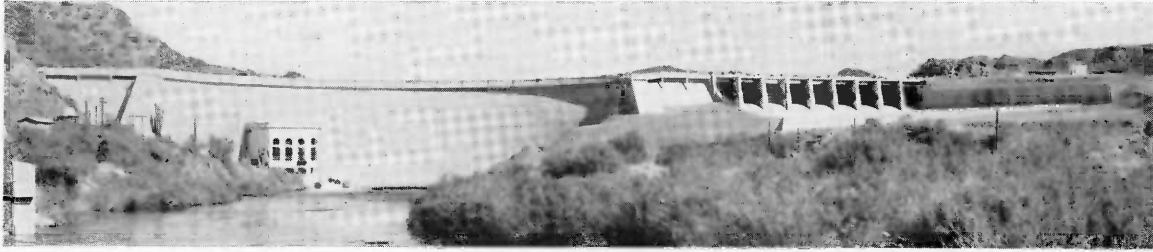
TRANSPORTATION. The project is served by the Southern Pacific and Santa Fe railroads. There are 350 miles of concrete paved roads within the project outside of towns and 600 miles of improved roads. Few farms are more than a mile from pavement. Fast truck services are operated to the Coast and eastern points and to marketing points within the state. Regular air mail and passenger service is maintained from Phoenix.

RECREATION. The nearby lakes and high, pine clad mountain region to the north and east are easily accessible in summer over excellent highways. The valley has a considerable winter population, and many maintain permanent homes. Abundant

CLIMATE. The climate is semi-tropical. The elevation averages 1,200 ft. above sea level. The average rainfall over a period of 40 years is 7.5 inches. Snow is practically unknown. The percentage of possible sunshine, averaged for Phoenix, is 84. The summer days are hot, but the nights are fairly cool. The low humidity, however, makes the highest temperatures much less oppressive than lower temperatures in localities with higher humidity. The spring, fall and winter months are delightful. Winter temperatures permit the growing of citrus without frost protection in the more favored sections and of lettuce, peas, grain, alfalfa, pasture, etc., over the entire valley. Approximately 80 per cent of the project area is in winter crops. Such frosts as occur are light and the average period between the first killing frost in fall and the last killing frost in spring is 69 days.

(Continued on next page)

Salt River Project, Arizona



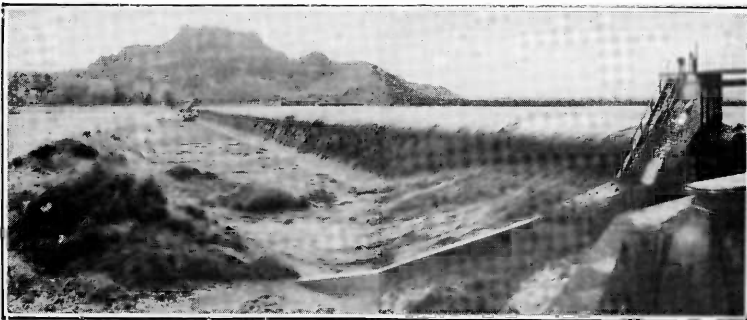
STEWART MOUNTAIN DAM

Begun Oct. 1,
1928. Finished
March, 1930.
Spillway addi-
tions made 1936.

STEWART MOUNTAIN DAM AND POWER PLANT

Type, variable-radius arch, with gravity section on each end and overflow spillway section on east.

Length, over all, ft.....	1,260	RESERVOIR:		POWER PLANT:	
Elev. top (coping) above sea, ft	1,535	Capacity, ac. ft.....	70,000	Capacity, H. P.....	17,500
Height from bed rock, ft.....	212	Area, acres.....	1,300	Head, ft.....	116
Volume concrete cu. yds.....	122,000	Length, miles.....	10	COST, dam and plant,	
		Drainage area, sq. mi.....	100	(1930)	\$2,515,000
		Spillway capacity, sec. ft.....	150,000		
		Concrete in dam (1934) cu yds	122,000		

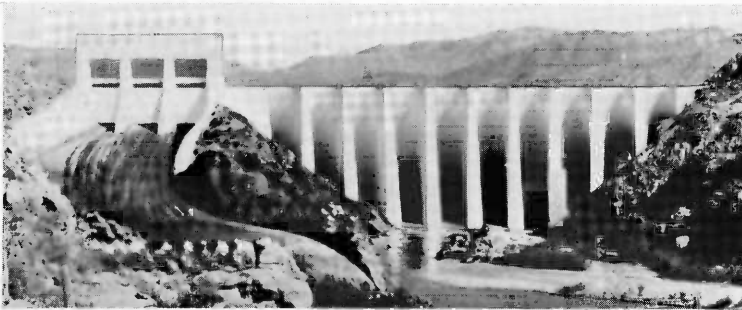


GRANITE REEF DIVERSION DAM

Begun 1906—completed 1907

Type, gravity overflow, rubble concrete.

Length, ft.....	1,000
Elevation crest above sea, ft.....	1,310
Height—Max. ft.....	38
CONCRETE: In dam (1921) cu. yds.....	40,000
COST:	\$627,000

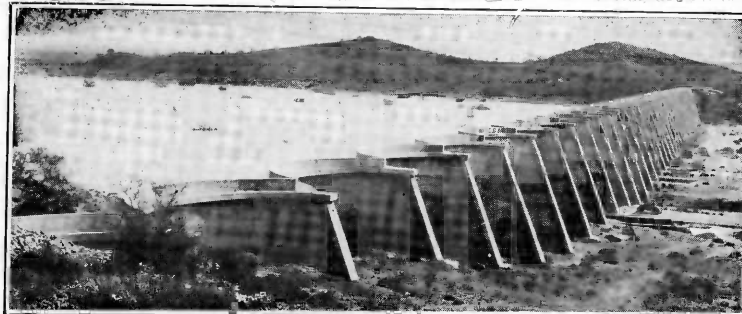


BARTLETT STORAGE DAM (Verde River)

(Photographed from model)

Begun 1936. Completion scheduled 1939. Type, Multiple arch, reinforced concrete.

Length, ft.....	750
Elevation top (coping) above sea, ft.....	1,803
Height from bed rock, (approx.) ft.....	270
Thickness of arches at base (max.) ft.....	7
Thickness of arches at top, ft.....	2.34
RESERVOIR: Capacity, ac. ft.....	200,000
Area, acres.....	4,000
Length, miles.....	12
Drainage area, square miles.....	5,500
Spillway capacity, sec. ft.....	150,000
CONCRETE: In dam (approx.)	
cu. yds.....	165,000
COST: (estimated).....	\$4,000,000



CAVE CREEK FLOOD CONTROL DAM

Begun 1922—completed 1923.

Type, multiple arch, reinforced concrete.

Length, ft.....	1,648
Elevation top (coping) above sea, ft.....	1,642
Height—Max. ft.....	109
RESERVOIR: Capacity, acre ft.....	14,000
Area, acres.....	750
Length, miles.....	1 1/4
Drainage area, square miles.....	162
CONCRETE: In dam (1923) cu. yds.....	18,575
COST:	\$556,000

(Description continued from preceding page)

accommodations are available, ranging from the various palatial hotels to well equipped auto courts.

THE SALT RIVER VALLEY WATER USERS' ASSOCIATION is a corporation organized under Arizona laws in 1903 to take advantage of the Reclamation Act, so that a contract could be made (1904) with the Government whereby liens could be placed on project farm lands guaranteeing the payment (over a long period of time) of the cost of building Roosevelt dam and other project

works. When the project was turned over to the farmers in 1917 the unpaid construction debt was \$10,000,000 of which \$7,000,000 has since been repaid. These debt payments plus the additional development described have been financed by direct assessments collected from the landowners, by power revenues and by bond issues. The Bartlett dam and other construction by the U. S. Bureau of Reclamation (1935-39) increases the Federal investment in the project by about \$6,000,000.

Salt River Project

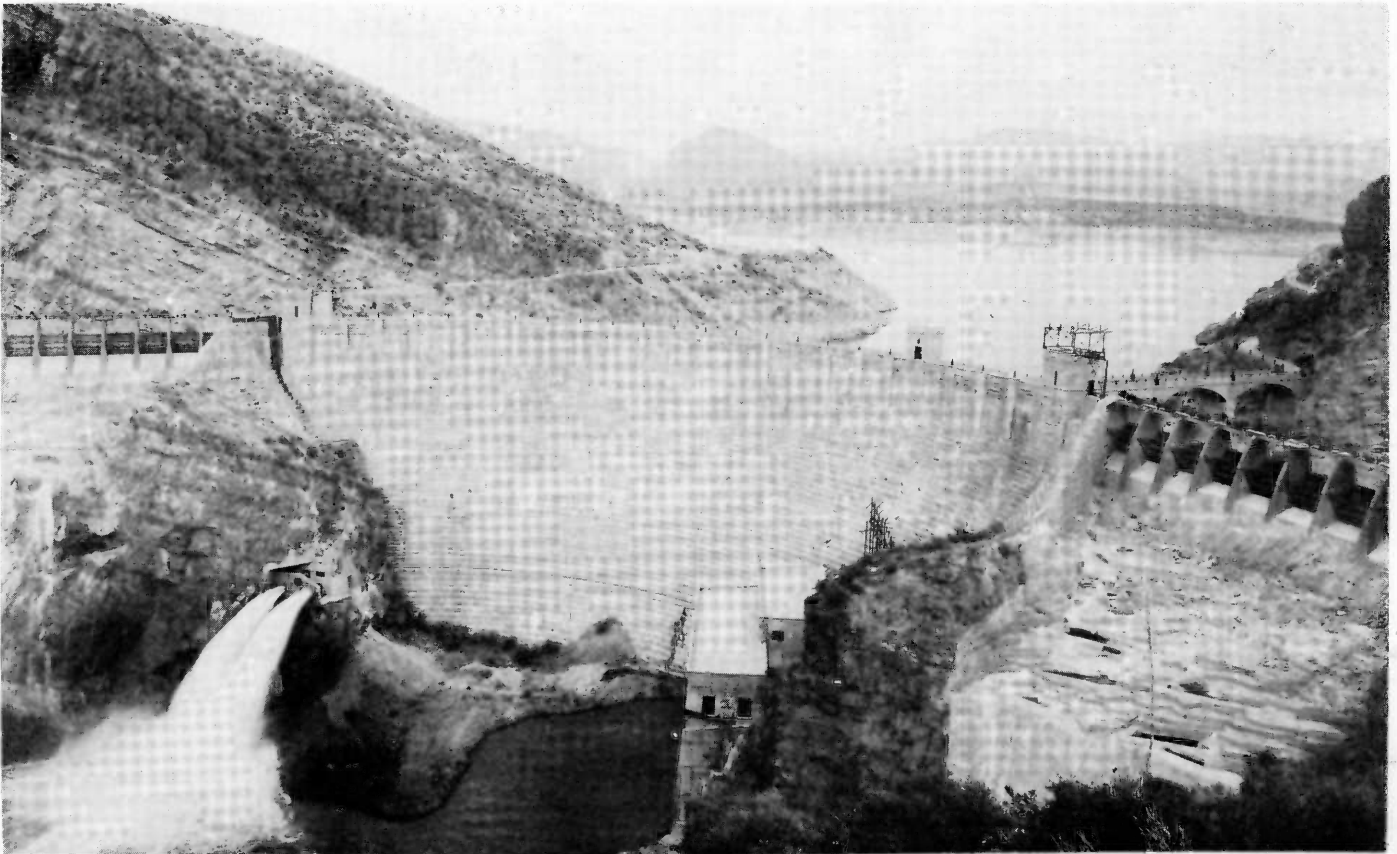
(Identical with Salt River Project Agricultural Improvement and Power District)

Arizona

Operated by the

Salt River Valley Water Users' Association

1941



ROOSEVELT DAM

Built 1905-11, Add'ns. 1923-24 - Spillways lowered 1937

Elev. Coping	2,146	Max. Thickness, base, ft.	184	Lake Cap'y. Jan. 1939, ac.-ft.	1,400,000
Normal High water elev....	2,136	Thickness at top, ft. ...	16	Lake Area, acres	17,800
Spillway crest elev.	2,120.25	Cu. Yds. Masonry	343,750	Lake Length, miles	23
Length, dam proper, ft. ..	723	Drainage Area, sq. mi. ..	5,830	Head on turbines, ft.	112-222.
Ht. bedrock to roadway, ft.	280	Spillway Cap'y., sec.-ft.	150,000	Generating Cap'y., H.P.	24,000
		Cost, dam and power plant			\$5,560,000

DESCRIPTION OF PROJECT

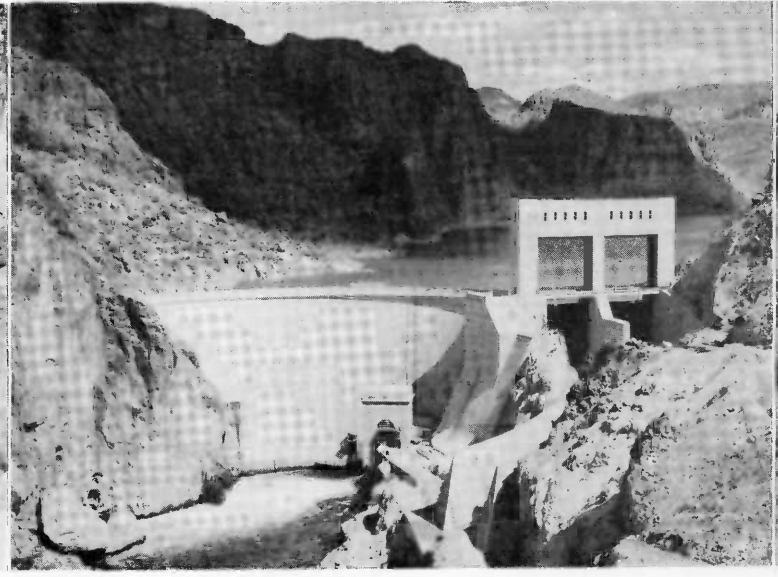
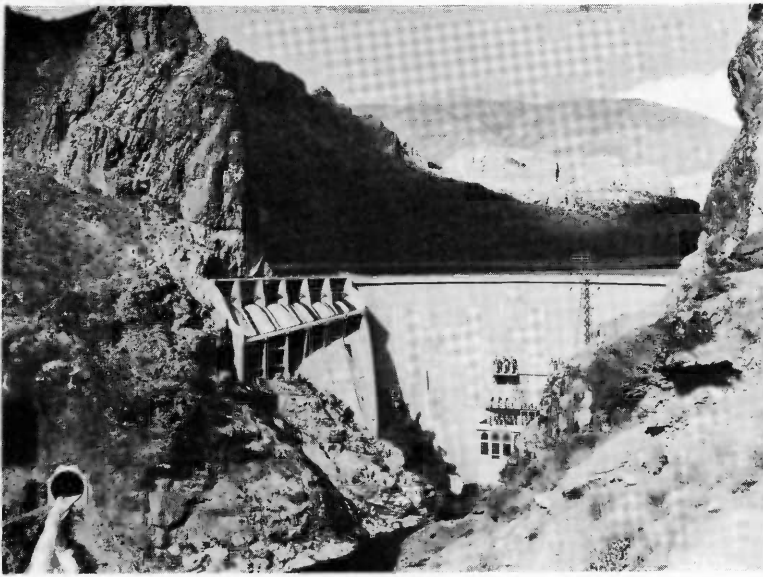
GENERAL DESCRIPTION: The Salt River Project, under the Roosevelt dam, is one of the first major irrigation projects undertaken by the U. S. Reclamation Service (now Bureau of Reclamation) under the National Reclamation Act. It covers parts of three counties in south central Arizona and includes Phoenix (80,000, the state capital,) and other valley cities with a population in excess of 15,000. It comprises 240,000 acres (net) of highly developed farm land and furnishes a partial irrigation supply for 95,000 acres of non-project land. The Salt river passes through the valley from east to west and picturesque mountains rise abruptly from the plain on all sides.

The investment in irrigation, power and other works is around \$43,000,000. Besides the seven large dams pictured and described here, there are two major diversion dams, 1,400 miles of canals and laterals with over 10,000 structures, 1,500 miles of electric power lines with 20 large sub-stations, 550 miles of telephone lines, 2 large warehouses, 2 office buildings, over 100 residences and 170 pumping plants. The normal operating force varies from 600 to 800 employees. The eight hydro-electric power plants and the 10,000 KW Diesel plant have a combined generating capacity of 130,000 H.P. This system, with power now available from the Colorado river, assures an ample supply of low-priced electricity indefinitely.

The 10,000 farms of the Salt River Valley Water Users' Association are all served with electric power - half directly from the project system and half indirectly through municipalities and utility compan-

ies. There are 900 miles of surfaced highways within the project boundaries (not counting towns and cities) half of which are concrete or other hard paving. Farming is carried on throughout the entire 12 months and directly or indirectly supports a population in and adjacent to the project of nearly 200,000. Pioneer days here are long past and all lands, homes and Communities are highly developed. The outstanding advantages offered to visitors and others are the resort features of climate and surroundings, pleasant living conditions (particularly for winter tourists and home seekers) and adaptability to citrus and other high-class horticulture likely to appeal to people of means.

HISTORY OF PROJECT. A large part of this area was cultivated in prehistoric times but abandoned long before the coming of white men. Many interesting remains of ancient villages and canals still exist. Modern irrigation began about 1867. The river flow is erratic, varying from a small stream to enormous floods. This supply at low river stage was inadequate for all the land attempted to be cultivated, while all flows in excess of immediate needs or canal capacities were wasted due to lack of storage facilities. In 1902 Congress passed the Reclamation Act and under it the Government financed and built Roosevelt dam, which enabled these flood waters to be stored and held over for use as needed. The dam was put in service in 1910, being finally completed in 1911. To efficiently divert the water from the river into the canals and to distribute it to the lands required a permanent diversion dam and a complete system of canals and laterals. These were also included in the Government work and a supplemental water supply made available from pumping plants to utilize



HORSE MESA DAM - ON SALT RIVER
Built 1924-27. Add'ns. to Spillways 1936-37

Elev. Coping,	1,920	Drainage Area, sq. mi...	5,940
Normal High Water elev...	1,914	Spillway Cap'y. sec.-ft.	150,000
Spillway crest elev.	1869.5-1891	Lake Cap'y. ac.-ft.	245,000
Length, dam proper, ft...	660	Lake Area, acres	2,600
Ht. bedrock to deck, ft..	300	Lake Length, miles	17
Arch thickness, base, ft..	57	Head on turbines, ft. ..	253.5
Arch thickness, top, ft..	8	Generating Cap'y. H.P....	43,000
Cu. Yds. Concrete	159,000	Cost, dam & power plant	\$5,248,000

MORMON FLAT DAM - ON SALT RIVER
Built 1923-25. Spillway Altered 1936-38

Elev. Coping,	1,671	Drainage Area, sq. mi...	6,100
Normal High Water elev...	1,660.5	Spillway Cap'y. sec.-ft.	150,000
Spillway crest, elev.	1,610.5	Lake Cap'y. ac.-ft.	57,800
Length, dam proper, ft...	380	Lake Area, acres	945
Ht., bedrock to deck, ft..	224	Lake Length, miles	10
Arch thickness, base, ft..	20	Head on turbine	131.5
Arch thickness, top, ft..	8	Generating Cap'y. H.P....	10,000
Ju. Yds. Concrete	59,200	Cost, dam & power plant	\$2,497,000



GRAND CANAL. SALT RIVER PROJECT

underground water. A hydro-electric generating plant at Roosevelt dam and four others at drops in main canals, together with the necessary transmission lines, were provided to supply cheap power for pumping and other project operations. In November, 1917 the project was turned over as a going concern to the farmers, subject to payment of the unpaid balance on construction costs. From 1922 to 1930 the Water Users' Association built the Horse Mesa, Mormon Flat and Stewart Mountain dams and power plants on the Salt river below Roosevelt, and the Cave Creek Flood Control dam. In 1935-39 additional Reclamation Act improvements, including the Bartlett dam and spillway improvements on the four Salt river storage dams, were made by the United States. In 1937-38 the water Users' Association built a 10,000-KW Diesel power plant to supplement its generating facilities. In 1940 power from Boulder became available through the construction by the Bureau of a 140-mile high tension power line from Parker dam to Phoenix. The first changes from 25 to 60-cycle power were made in 1940 to utilize power from this source.

Of the total \$21,000,000 capital investment by the United States to June 1939, \$12,000,000 has been repaid. The balance is payable under the Reclamation Act in small long-time installments. The remaining \$22,000,000 of capital investment has been financed by the farmers without Government aid, and carried out independently during the period 1917-1940. The outstanding features of these improvements have already been mentioned and are shown and described in the views and accompanying tabulations.

PROJECT LANDS. The Salt River Valley is roughly 20 miles wide and 50 miles long, the horizon being limited by a fringe of mountains on all



(above)

GRANITE REEF DIVERSION DAM
ON SALT RIVER
Built 1906-08

Elev. Crest,	1,310
Elev. top, abutments,	1,325
Length of Weir, ft.	1,000
Ht., crest to top of cut-off, ft.	29
Cu. Yds. Concrete	40,000
Drainage Area, sq. mi.	12,950
Cost	\$627,000



sides. The surface is nearly level and the soil extends to great depths. Land values range from as low as \$150 up to \$1,500 per acre, depending on location, crop and improvements. It is all in private ownership and highly developed.

WATER SUPPLY. The main water supply is furnished by the Salt and Verde rivers, draining 13,000 square miles of mountain watershed. The four storage reservoirs on the Salt form a continuous chain of lakes nearly 60 miles long and with Bartlett reservoir on the Verde, will hold 1,972,000 ac.-ft. of stored flood waters. An important supplemental supply is obtained from 170 pumping plants for utilizing underground water. As an emergency, up to a third of the water delivered to the farms has been obtained from this source in years of extreme drouth.

The net cost to the farmer for water varies from around \$2.50 to \$8.00 per acre per season, depending on the crop and amount of water used, the average being about \$4.00 per acre. This includes all operation, maintenance, and annual payments on construction costs.

POWER SYSTEM. Advantage is taken of the entire 723 ft. fall from high water level at Roosevelt to tail water below Stewart Mountain dam to develop power. Horse Mesa, Mormon Flat and Stewart Mountain are primarily power dams. However, they add 373,000 ac.-ft. to storage which, when needed, is available for irrigation. Irrigation storage is the fundamental purpose of Roosevelt although it develops 24,000 H.P. Four other hydro-electric plants on the canal system in the valley utilize 200 ft. total head for power. The 13,500 H.P. Diesel plant furnishes

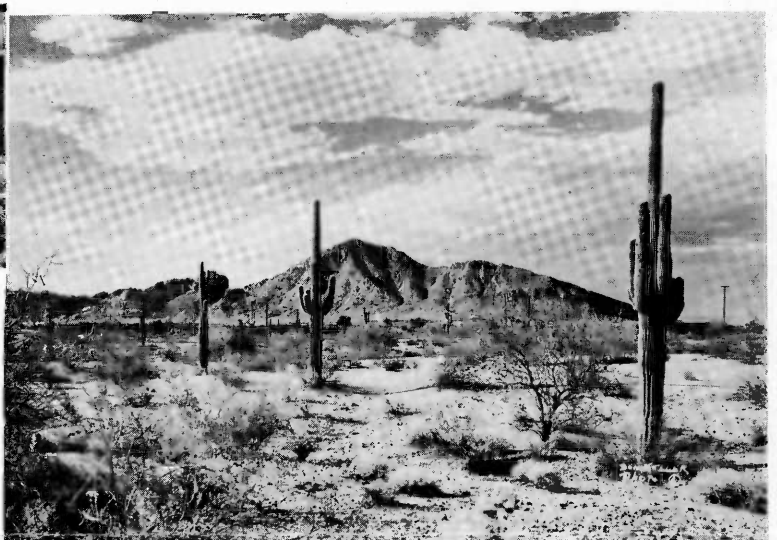


STEWART MOUNTAIN DAM - ON SALT RIVER
 Built 1928-30. Add'n. to Spillway Channel 1936-37

BARTLETT DAM - ON VERDE RIVER
 Built 1936-1939

Elev. Coping,	1,535	Drainage Area, sq. mi...	6,200
Normal High Water elev...	1,529	Spillway Cap'y. sec.-ft.	150,000
Spillway crest elev.	1,506	Lake Cap'y. ac.-ft.	70,000
Length, dam proper, ft...	1,260	Lake Area, acres	1,300
Ht., bedrock to deck, ft.	207	Lake Length, miles	10
Arch thickness, base, ft.	33	Head on turbine	116
Arch thickness, top, ft...	8	Generating Cap'y. H.P...	17,500
Cu. Yds. Concrete	131,730	Cost, dam & power plant	\$2,839,000

Elev. Coping,	1,803	Cu. Yds. Concrete	165,000
Normal High Water elev...	1,798	Drainage Area, sq. mi...	5,500
Spillway crest elev.	1,748	Spillway Cap'y. sec.-ft.	175,000
Length, dam proper, ft...	800	Lake Cap'y. ac.-ft.	200,000
Max. Ht. bedrock to deck, ft.	283	Lake Area, acres	4,000
Arch thickness, base, ft...	7	Lake Length, miles	12
Arch thickness, top, ft...	2.34	Cost, (Am't. charged to Project)	
		exclusive of am't. charged to Indian lands	\$4,000,000



(left)
CAVE CREEK FLOOD CONTROL DAM
 ON CAVE CREEK
 Built 1922-23

Elev. Coping,	1,642
Length, ft.	1,648
Max. Ht., ft.	109
Cu. Yds. Concrete	18,575
Lake Cap'y. ac.-ft.	14,000
Lake Area, acres	750
Lake Length, miles	1 1/2
Drainage Area, sq. mi.	162
Cost	\$556,000

Unreclaimed Desert Land.

standby power, in addition to steam and other power available from local power companies, mines, etc., and hydro power now available from Boulder. The comparatively low cost of irrigation water, considering the large quantity used and the large amount of pumping, is due in large part to the availability of power from the project system and revenues realized from the sale of surplus power.

CLIMATE. Every variety of climate, from sub-tropical in the valley to cool temperate in the pine-clad mountains, may be found within two hours drive of Phoenix. The annual rainfall varies from 3 to 20 inches, with an average of 7. The percentage of sunshine is 84. Summer days are hot but nights are pleasant and the dry air adds greatly to comfort during the day. Practically all residences and business buildings are air-cooled. Low humidity makes this possible with inexpensive evaporative-type coolers operated at low cost by cheap power.

The mild winters afford a 12-months growing season and permit double-cropping of much of the project, favoring the cultivation of citrus, winter vegetables, etc.

TOWNS AND CITIES. Phoenix (80,000 - 65,000 by 1940 census within corporate limits and 15,000 suburban) is a typically up-to-date American city with thoroughly modern schools, churches, hospitals, parks, banks, theatres, business houses and other institutions. There are 11 other cities and towns within the project.

TRANSPORTATION. The project is served by the Southern Pacific and Santa

Fe railroads and by numerous fast truck and bus lines. Phoenix owns its own airport and has daily air mail and passenger service.

CROP ACREAGE - 1939

Barley, Oats, Wheat & Sorghums.	44,893	Cantaloupes	7,029
Seed, Alfalfa & Beets	7,645	Lettuce	24,801
Hay, incl. Alfalfa, Alfalfa-grain & Alfalfa after Grain ..	105,850	Garden, Truck & Miscel..	7,303
Sudan Grass	5,497	Fruit, Citrus	12,467
Pasture, Grain, Alfalfa, etc...	105,594	Fruit, Deciduous & Small	1,453
Pasture, Bermuda	12,447	Cotton, Long & Short...	52,889
Corn, Ensilage	1,460	Cotton, Seed	52,889
		Fallow	8,000
Gross Area Cropped 1939			450,217
Less Areas Double-cropped			223,058
Net Area Cropped 1939			227,159
Yards, Highways, Rights-of-way, etc.			15,711
Gross Project Farm Area			242,870

Average Gross Crop Value per Year
 for the 5 Years Ending 1939, \$18,534,746.

LIVESTOCK - 1939

Average Value, 5 Years ending 1939	\$3,453,684
--	-------------



Salt River Project, Arizona

SUMMARY, STATISTICAL DATA

Area project farms irrigated, acres	240,000	Concrete or other hard paving, miles	450
Area non-project land furnished part supply	95,000	Surfaced (gravel, etc.)	450
Number project holdings - 1 acre and over, 1940	10,000	Owned by project	300
Number towns (seven incorporated)	12	IRRIGATION SYSTEM	
Area in towns and cities, acres	10,000	Area watershed, sq. mi.	13,000
Elev. Valley above Sea, ft.	900-1275	Dams	6
Precipitation - average inches per year	7	Diversion	3
Temperature - max. & min. degrees F	25-115	Storage Cap'y, ac.-ft.	1,972,000
POPULATION, 1940, Rural	163,000	Canals and Ditches, miles	1,400
Towns and Cities	91	Cap'y. main canals, sec.-ft.	4,000
Schools, number, 1940	152	Pumping plants	170
Churches, number, 1940	7	Power Plants - Hydro-electric	8
Banks - number (including branches)	7	Diesel	1
Deposits, 1940	\$64,000,000	Total Generating Cap'y. H.P.	130,000
Hotels, 1940 (exclusive of auto courts)	65	Total head utilized, feet	4
Hospitals (exclusive of sanatoria)	7	4 Salt River Plants	723
Highways, Federal, State & County,		4 Valley Plants	200

Transmission Lines, miles	1,500	Warehouses	2
Sub-stations	20	Office Buildings	2
Buildings owned by Project		Residences	100
Residences	170	Pump houses	9
Power houses	313	Miscellaneous	30
Roads operated by Project, miles	310	Employees - Normal operating force	600-800

Value farm land per acre, 1940,	\$150-\$1500
Cost of irrigation and power system	\$43,000,000
Cost of water to users, per acre per year (including all operation, maintenance and debt service)	\$2.50 to \$8.00
Crop value - average 5 years ending 1939	\$18,534,700
Livestock - average value 5 years ending 1939	\$ 3,453,664

