

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

Volume 25

JANUARY 15 • 1950

Number 1

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Covering Construction in the Western Half of the United States

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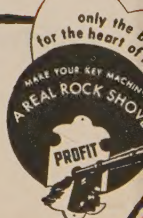
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WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
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Vol. 25, No. 1

Government Construction Figures for 1949 and 1950

LOOKING FORWARD into 1950 the United States Department of Commerce predicts a total national volume of all types of construction equal to 1949. This over-all estimate, which is also the estimate of the Department of Labor, includes all residential and farm construction. These governmental agencies predict that residential construction will be off 7% and farm construction will be off 11% compared to 1949. At the same time they estimate that public works will exceed last year by 18% on a nationwide basis.

This 18% national increase will boost public construction from the \$5.2 billion figure in 1949 to a record of \$6.1 billion of work-put-in-place, according to the Governmental agency. The increase will affect all types of construction, except military and naval.

The break-down of this public works estimate indicates that the types of construction of most interest in the West, and to the readers of *Western Construction News*, are expected to top the corresponding figures for 1949 by the following: Highways—up 15%, Water Development—up 20%, Sewer and Water—up 16%, Institutional Buildings—up 28%, Non-residential—up 14%.

Public housing may increase as much as 82% (\$220,000,000 to \$400,000,000) as a result of activity under the Housing Act of 1949. Pressure for more school facilities will raise expenditures for educational building by an estimated 7% in 1950.

To translate these Government figures into specific construction volume for the individual states of the West is difficult because the 1949 Dept. of Commerce figures are available for only the first nine months of the year. However, these figures are presented in the accompanying table and may be increased by one-third to provide an approximation for the full twelve months of 1949. To these figures the predicted increases in per cent can be applied to provide a rough approximation by states of the value of public construction (work-put-in-place) which may be expected during 1950.

On the basis of physical volume—as compared to dollar volume—the same agencies estimate that the 1950 national total for all types of construction will be on a par with the record set in 1949. During the past year the Dept. of Commerce Index of Construction Costs (1939 equals 100) declined gradually from 211.3 in January to a low point of

205.1 in August. Demand for materials will tend to support current price levels and wage rates will be sustained, which should extend the present level of construction cost through the present year.

Production materials

During the first nine months of 1949 the production of construction materials was about 10% below the corresponding output of 1948, according to the Dept. of Commerce statistics. Since many of the materials making up this index relate to residential construction, the drop can be attributed to the decline in residential construction during the first half of the year.

Fabricated structural steel shipments (national figures) were 1% over 1948 for the first nine months of 1949. Lumber production in the United States will approach 31 billion board feet, which is about 14% below the 1948 figure. Corresponding figures for plywood were 1,331,661 thousand square feet compared to 1,442,960 in 1948. Shipments of cement for the first three-quarters of 1949 were 159,000,000 bbl. which was an increase of 2% over 1948. Production of cement in the United States was estimated at 210,000,000 bbl. for 1949, and this figure represents a slight increase over the production record established in 1948.

PUBLIC CONSTRUCTION (Nine Months of 1949)

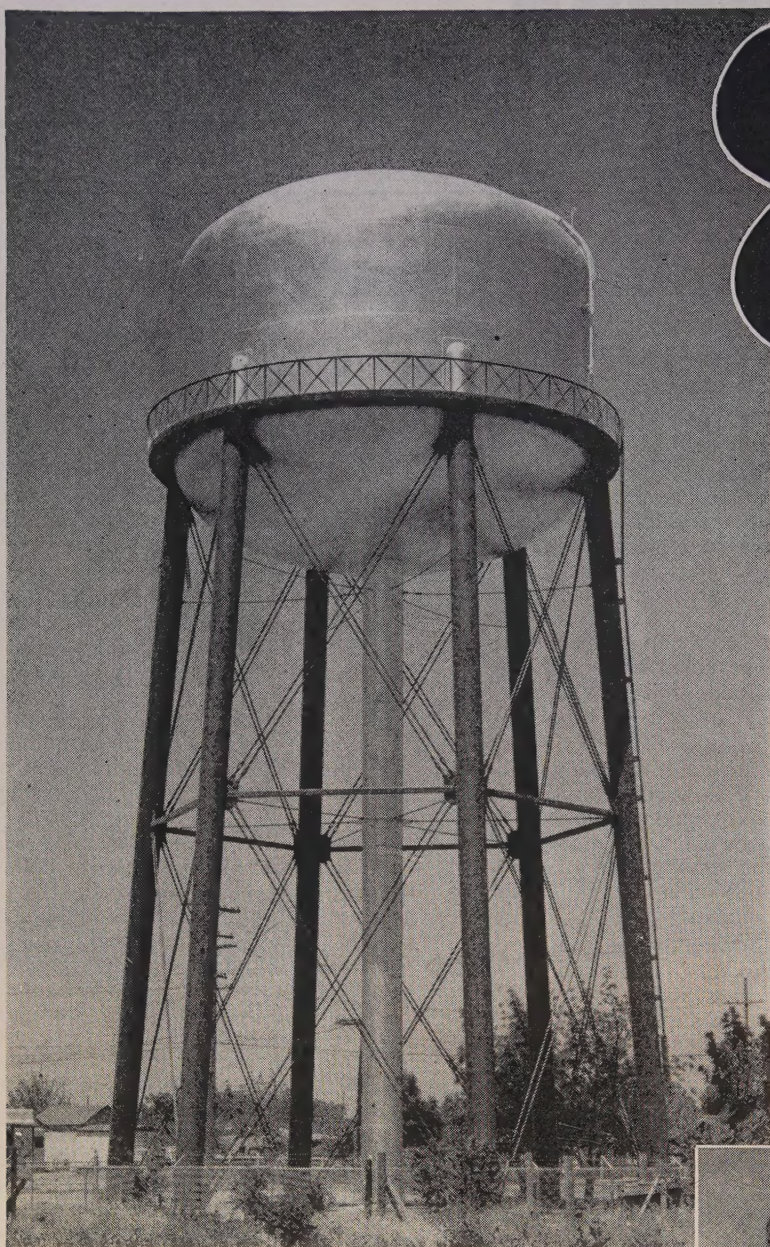
Arizona	\$ 40,100,000
California	365,800,000
Colorado	46,700,000
Idaho	19,600,000
Kansas	62,800,000
Montana	37,400,000
Nebraska	47,800,000
Nevada	6,700,000
New Mexico	22,100,000
North Dakota	38,400,000
Oklahoma	65,600,000
Oregon	63,300,000
South Dakota	32,800,000
Texas	226,900,000
Utah	17,300,000
Washington	120,400,000
Wyoming	27,400,000
Total	\$1,241,100,000
U. S. Total	\$3,875,000,000
% of U. S.	32%

More Elevated Storage for Stockton

Third Horton Tank added to distribution system

These tanks at Stockton, California, are an outstanding example of the way a progressive water works operator solves the problem of maintaining water pressure in far-flung distribution systems. Here—as in several other west coast cities—the California Water Service Company “distributes” its water storage in several elevated tanks, which are located in various parts of the city. Each area is able to meet peak demands with its own water reserve, a reserve that flows into the mains by gravity pressure alone.

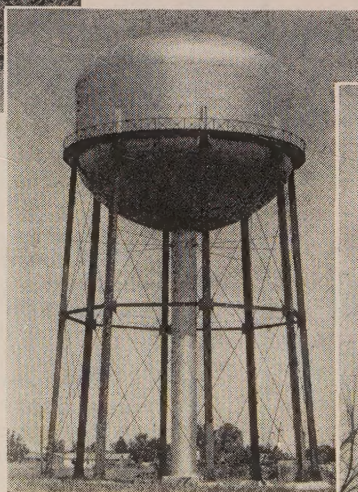
Horton elevated tanks for distributed storage are available in capacities up to 3,000,000 gals. Installations for municipal service are built in accordance with American Water Works Association specifications. Write the nearest office listed below for details.



The Horton ellipsoidal-bottom tank shown above has a capacity of 300,000 gallons. It is the newest member of the distributed storage “team” at Stockton.

The two Horton ellipsoidal-bottom tanks shown in the views at the right have a capacity of 500,000 gallons each.

The Stockton installation proves that, once a municipality has experienced the benefits of gravity water pressures, it will use more elevated tanks when additional storage facilities are needed.



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West's Greatest Peace-Time Construction Year Forecast

which had no appropriation for fiscal year 1949, was given \$450,000,000 nationally, of which over \$108,000,000 is available to the 17 Western states. Unannounced in detail, but in the neighborhood of \$225,000,000, will be the expenditures of the Atomic Energy Commission at Arco, Ida., Hanford, Wash., and Los Alamos, N. Mex.

Highway funds increased

Faced with a tremendous demand for highway building, nine of the Western states at the 1949 meeting of their Legislatures raised their gasoline tax to secure additional funds. The full force of these increases will be felt for the first time in the 1950 construction season. Leading the increase, New Mexico and North Dakota each upped the tax by 2¢ per gal. Washington raised the levy by 1½¢ per gal., while five states, Montana, Oregon, Nebraska, Kansas and Oklahoma, each added 1¢ to the tax. Nevada raised its charge by ½¢ per gal. In some states, registration and truck fees were also raised. While it is difficult to estimate what this will amount to in total available funds, it is obviously a vital "shot in the arm" for highway construction.

Private utility companies are vigorously pursuing their construction programs, most of them being in the middle of five-year postwar expansion plans. Total expenditures in this field are anticipated to just about hold even with 1949. Engaged in extensive expansion programs are Southern California Edison Co., Los Angeles; Los Angeles Department of Water and Power; Pacific Gas and Electric Co., San Francisco; Utah Power & Light Co., Salt Lake City; California-Oregon Power Co., Medford,

Ore.; Idaho Power Co., Boise; Montana Power Co., Butte; Public Service Corp. of New Mexico, Santa Fe; El Paso Natural Gas Co., El Paso, Tex.; and many others.

Municipal facilities hold even

Residence building, predicted to fall off nationally, it is believed by *Western Construction News* will hold about even or be only very slightly lower in the West, where the continuing heavy migration of new people still exerts a strong demand. Water supply and sewage disposal projects in many Western cities are continuing, and new projects will be initiated this year in others. Cities with heavy programs already under way in these fields include Los Angeles, San Francisco, Oakland, Portland, Seattle, Spokane, Salt Lake City, Denver, Albuquerque, Cheyenne, Phoenix, San Diego, and numerous others.

The chart below graphically illustrates the course of construction in the West over the past 15 years, as observed by this magazine. With the single exception of the three war-boom years, the growth has been steady and constant. It is particularly significant that there was no serious let-down immediately after those war years, but that the forward movement continued at about the same pace that could have been expected if there had been no war.

The exact magnitude of the extension indicated on the chart for 1950 by a question mark is "anyone's guess." *Western Construction News* feels confident that, considering the increase of public construction discussed above, and the continuation of private work, it will reach about to the level indicated, an increase of 10% over 1949.

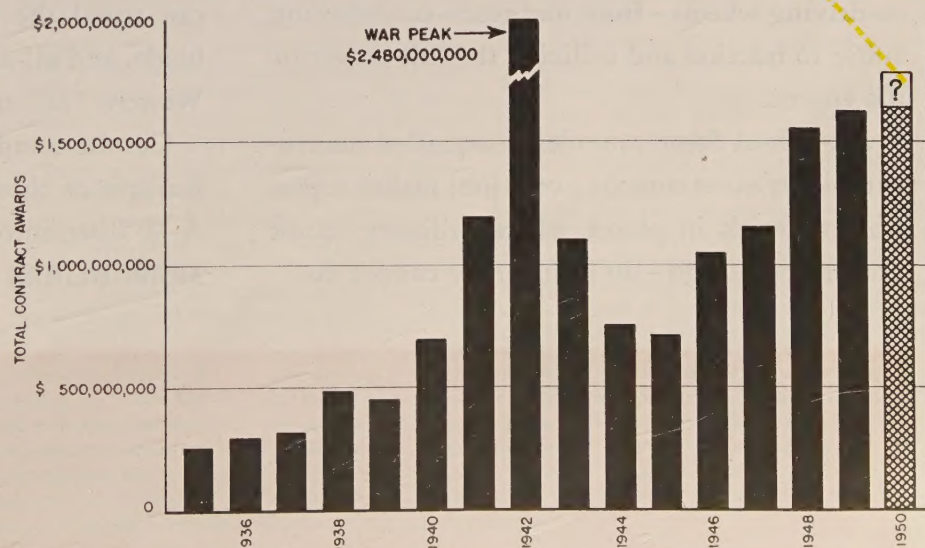
WHEREAS the government figures quoted on the preceding page indicate official anticipation of a nationwide construction program in 1950 which will just about exactly equal that of 1949, *Western Construction News* foresees a Western volume well in excess of last year. This prediction is not based on mere wish or hope, but on solid figures. The reader need only refer to page 61 of the Oct. 1949 issue of this magazine to observe the basic reasoning.

Construction may not be forced. This is the fundamental fallacy of some of the abortive postwar planning programs of a few years ago. Rather, construction follows population. When people come into a new area, it becomes necessary to supply them with houses, water, power, sewers, schools, streets and scores of other facilities. The table above referred to in the October issue of *Western Construction News* showed major cities of the West to have an average population increase of 30% in the last 8 years, to make this region by far the fastest growing part of the nation. It is simply inevitable that this vigorous and growing area should require a vast amount of new construction.

Greatest federal appropriations

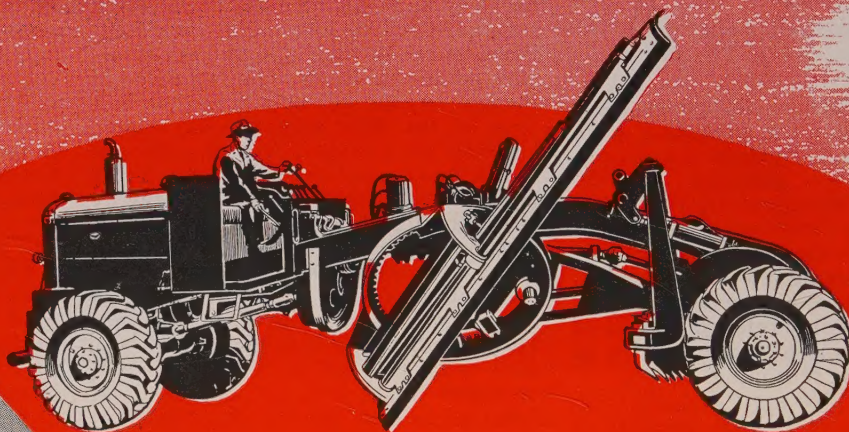
Further to solidify the belief that construction in the West will achieve new peacetime heights both in physical and dollar volume in the coming year, reference is made to articles on succeeding pages of this "Review and Forecast" issue. The Bureau of Reclamation, for instance, the entire construction budget of which is spent in the 17 Western states, has at its disposal this year the largest amount of money ever appropriated to the agency, \$356,514,510 as compared to \$251,541,139 in fiscal year 1949, the previous record.

The Corps of Engineers likewise has been given one of its largest peacetime construction appropriations, exceeding the 1949 funds for Western projects by \$56,000,000. The Bureau of Public Roads,



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Corps of Engineers— Construction Work at All-Time High

With more funds available than in any previous year, the Corps of Engineers is accelerating construction in the West—This article summarizes work on major projects

CONSTRUCTION work by the Army Engineers on Federal flood control and river and harbor projects in the 17 states of the West will be at an all-time high in the present fiscal year.

Larger Congressional appropriations have made possible a further acceleration of Federal postwar programs to provide greater protection from floods and to improve rivers and harbors for navigation purposes, with incidental benefits of hydroelectric power production, conservation of water for irrigation, and other beneficial uses. These programs have as their objective the achievement of a progressively greater control and utilization of the nation's water resources, including flood waters.

Congress appropriated \$246,305,720 for civil works construction work of the Corps of Engineers in the 17 states of the West during the 1950 fiscal year. This compares with the preceding fiscal

year's construction total of \$190,771,700. It is interesting to note that the 1950 total for the 17 states is 47.4% of the year's entire construction funds of the Corps of Engineers for the nation as a whole. In the 1949 fiscal year, the West's share was 41.2% of the national total.

In accordance with its policy of planning projects on the basis of river basins, the Corps of Engineers' western construction program is broadly divided into the following groups: Missouri River Basin; Columbia River Basin; Red River of the North Basin; New

Mexico and Texas Streams; Arkansas-White River Basins; Red - Ouachita River Basins; the Sacramento-San Joaquin River Basins; and South Pacific, Arizona, Nevada and Utah Streams.

A summary of the work follows:

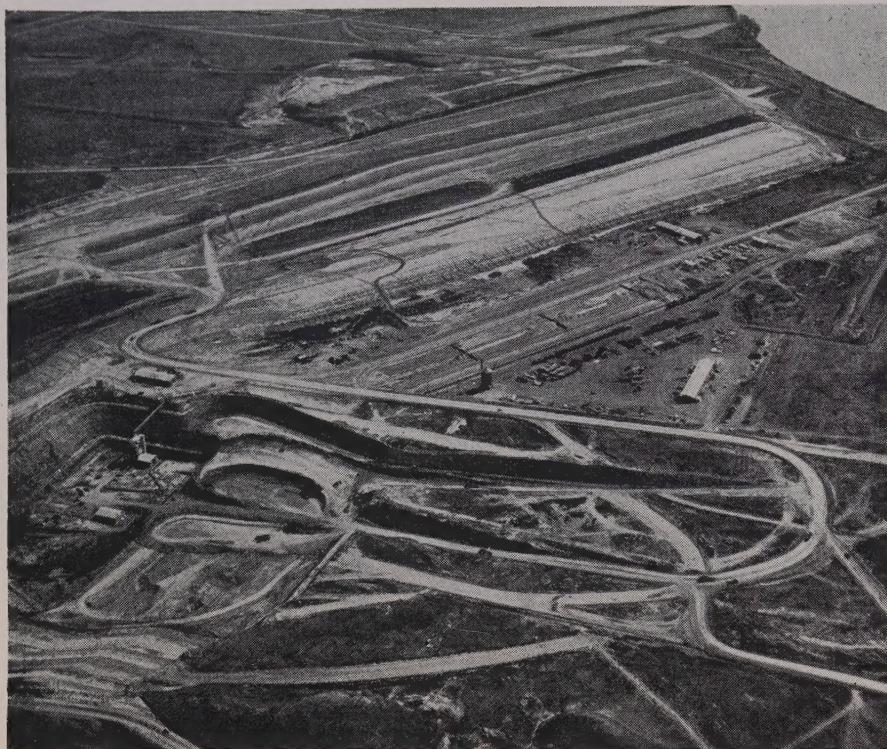
Missouri River Basin

Garrison Dam, North Dakota, which will be the world's largest rolled earth-fill dam when completed, is the key unit of five main stream reservoirs in the comprehensive plan for control and development of the water resources of the Missouri River Basin. Costing \$202,000,000, this project for flood control, irrigation, power, navigation and other beneficial purposes will be brought from 26% to approximately 40% of completion by the end of the 1950 fiscal year. Work in the current fiscal year will be on excavation and construction for the main embankment, completion of construction of the town to house personnel and their families, and on various other phases of the project.

Fort Randall Reservoir, South Dakota, another multiple-purpose unit in the basin plan, will be advanced from 15% to 32% of completion during the current fiscal year. The initial earthwork contract for the dam proper has been completed. Housing and administrative

PICTURED ABOVE—

A VIEW of preliminary work at McNary Dam and Lock within cofferdams on the Columbia River. The lock will be completed and the entire project brought to 31% of completion before July, 1950.



GARRISON DAM, to be the world's largest rolled earth dam, will be 40% completed by summer of 1950. View is of partially completed embankment, top, and powerhouse excavation, foreground.

facilities will be completed in the current fiscal year. Construction of an access road and access railroad is complete. Earthwork for the dam will be continued as well as construction of the outlet works. A continuing contract will be awarded for generators for the initial power installation. The entire project will cost \$165,900,000.

Harlan County Reservoir, Nebraska, which will provide flood protection benefits for wide areas in both the Republican River Basin and the Kansas River Basin and will store water for irrigation purposes, will be brought to 61% of completion during the current fiscal year. Work will continue on construction of the dam, land acquisition, and the relocation of highways and railroads. The relocation of Republican City, Neb., will be initiated, as well as clearing of the reservoir area near the dam site. This project has a total cost of \$49,897,000.

The Missouri River Agricultural Levees which will extend along both sides of the Missouri River from Sioux City to the mouth, for the protection of agricultural lands and small communities against floods, will be brought from 7% to about 18% of completion this fiscal year. The project, part of the Missouri River Basin's comprehensive plan, has a total estimated Federal cost of \$119,700,000. Levee construction will continue during the current fiscal year, as well as related work, including alterations to railroad facilities and highway bridges.

Work will continue during the 1950 fiscal year on the **Kansas Citys Project**, Kansas and Missouri, designed to supplement other units in providing flood protection for the two Kansas Citys and smaller adjacent communities. In addition

to milling and livestock industries, which rank among the largest in the world, many other industries and important rail yards are located in the flood plain to be protected. The Kansas Citys project, with an estimated Federal cost of \$41,389,000, will be brought from 40% to 61% of completion by the end of the 1950 fiscal year. The work under way includes construction of levees, flood walls, pumping plants, raising of bridges, channel excavation, cut-off channels and other appurtenant works.

Oahe Reservoir, South Dakota, construction of which was initiated in the 1949 fiscal year, will be brought to about 3% of completion this year. This project, estimated to cost \$234,400,000, has the second largest storage capacity of the proposed multiple-purpose reservoirs on the Missouri River, and will produce a large amount of hydroelectric power as well as provide navigation, irrigation, recreation and low flow benefits. Work in the current fiscal year will be on housing and administrative facilities, access roads and land acquisition for the earth-fill dam, which will be 242 ft. high and approximately 9,300 ft. long.

Fort Peck Dam, Montana, which is the world's largest hydraulic earthfill dam, will be advanced from 92% to 95% of completion during the current fiscal year. This project, costing \$136,900,000, serves the multiple purposes of navigation, flood control, power and irrigation. Continuing contracts will be initiated during the current fiscal year for installation of a third generating unit for the production of hydroelectric power. By the end of the year, contracts will be completed for permanent roads on the project, and a number of reservoir management and public use development items.

Work will be substantially completed this fiscal year on the construction of levees, floodwalls and pumping plants which, with other units, will provide flood protection for Omaha, Neb.

Cherry Creek Reservoir, Colorado, designed to provide protection from floods for Denver, its suburban area, and the agricultural area below the city, will also be completed in the 1950 fiscal year.

Another project being completed during the year is **Kanopolis Reservoir**, Kansas, designed to reduce flood heights at the Kansas Citys, and protect agricultural and urban areas along the Smoky Hill and Kansas Rivers.

The project for the protection of Hot Springs, S. Dak., will be advanced from 25% to 36% of completion.

Columbia River Basin

McNary Lock and Dam, near Umatilla, Ore., a navigation and power project costing \$227,028,000, will be advanced from 9% to 31% of completion. Construction of the navigation lock will be completed this fiscal year, and work is continuing on land acquisition, relocation of railroads and highways, fishways, and powerhouse facilities. McNary will have a 980,000-kw. power plant.

Preliminary excavation and construction contracts will be awarded in the 1950 fiscal year for **Chief Joseph Dam**, which will be built by the Corps of Engineers on the Columbia River, 51 mi. below Grand Coulee Dam. The power plant at this project will have an initial installation of 960,000 kw., with provision for a doubling of this capacity later, as required. The project, costing \$206,000,000, will be about 4% complete by June, 1950.

Detroit Reservoir, an integral unit in the comprehensive plan for flood control, navigation, irrigation, power development and other purposes in the Willamette River Basin of Oregon, will be advanced from 12% to 29% of completion during the current fiscal year. The year's work will include permanent housing, construction of dam and appurtenances, reservoir clearing, relocation of roads and facilities, and land acquisition. Cost of the project is \$69,797,000.

Lookout Point Reservoir, another multiple-purpose unit in the Willamette River Basin, will be brought from 11% to 37% of completion. Highway and railroad relocation will be continued, and reservoir clearing, fish facilities and construction of the earth dam and concrete spillway will be initiated during the year. The project will cost \$63,634,000.

Dorena Reservoir, also in the Willamette River Basin plan, will be brought from 80% to 94% of completion this fiscal year. Construction of the dam and spillway will be under continuing contract throughout the year. The project costs \$14,381,000.

Lucky Peak Reservoir, Idaho, a multiple-purpose project for control of destructive floods in the Boise River Valley, will be 17% complete by June, 1950. Continuing contracts will be under way during the 1950 fiscal year for construction

in of the outlet tunnel, embankment and cofferdam, spillway channel excavation and diversion channel. This is a 2,000,000 project.

Various miscellaneous items of work will be contracted for in the 1950 fiscal year at the Bonneville, Ore., power and navigation project. This \$84,858,000 project, which has installed power facilities aggregating 518,400 kw., will be advanced from 97% to 98% of completion by June, 1950.

Mud Mountain Dam, Washington, the highest rock-filled dam in the United States, rising 425 ft. above bedrock, will be brought to 98% of completion. The year's work comprises wind-up operations, including the construction of an access road and administrative facilities and landscaping. Cost of the project is \$3,285,000.

Other construction work in the Columbia River Basin during the 1950 fiscal year will be at the Heise Roberts Area, Idaho; Cottage Grove Reservoir, Oregon; Fern Ridge Reservoir, Oregon; Milton-Freewater, Oregon; Willamette River bank protection, Oregon; Mill Creek, Washington; Tacoma, Washington; Coos Bay, Oregon; Depoe Bay, Oregon; Umpqua River, Oregon; Yaquina Bay and Harbor, Oregon; and Grays Harbor and Chehalis River, Washington.

Red River of the North Basin

The Red River of the North project for flood control, water supply and other beneficial purposes in eastern North Dakota and northwestern Minnesota will be advanced from 1% to 10% of completion. Land acquisition will be continued, and construction of **Orwell Dam** and channel improvements will be initiated. Cost of this project is \$11,766,000.

Baldhill Reservoir, North Dakota, a flood control and water conservation project on the Cheyenne River, will be brought from 66% to 82% of completion. Land acquisition, reservoir clearing and closing of the earth dam will be the main operations in the current fiscal year. Cost of the project is \$2,704,500.

Construction will be substantially completed in the 1950 fiscal year on the 1,339,000 **Homme Reservoir**, North Dakota, a flood control and water conservation project on the Park River.

New Mexico and Texas Streams

Whitney Reservoir, Texas, an integral unit in the comprehensive plan for flood control and other purposes in the Brazos River Basin, will be advanced from 24% to 54% of completion in the 1950 fiscal year. The project, costing \$41,794,000, will have flood control, low-flow regulation, and power development benefits. The year's work will include further construction on dam and embankment; relocation of railroads, utilities and cemeteries; land acquisition, and contracting for turbines and generators.

Construction work will continue on four Texas projects designed to harness the often turbulent waters of the Trinity River and its tributaries and store water

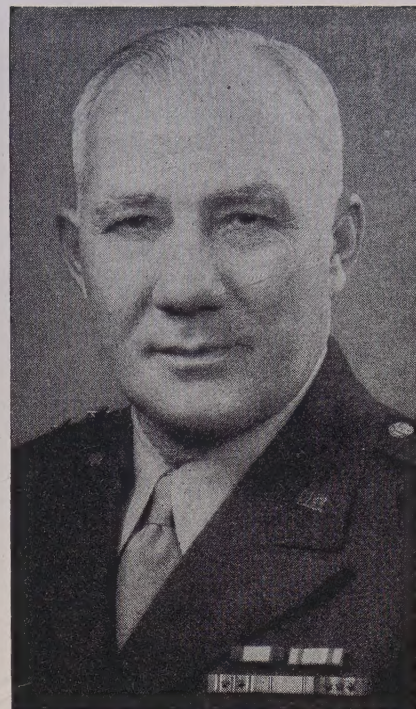
for industry and municipal use. **Benbrook Reservoir**, a \$14,000,000 project, will be advanced from 20% to 55% of completion. **Grapevine Reservoir**, a \$14,390,000 project, will be brought from 11% to 52% of completion. **Lavon Reservoir**, a \$16,380,000 project, will advance from 9% to 37% of completion. **Garza-Little Elm Reservoir**, a \$23,321,900 project, will be brought from 3% to 14% of completion.

Belton Reservoir, Texas, a flood control and conservation unit in the Brazos River Basin, will be advanced from 2% to 9% of completion. Construction of the initial earthen embankment and land acquisition will continue. Contracts will be awarded for the construction of outlet works and the manufacture of service and emergency gates. The project will cost \$22,500,000.

Construction work will be initiated on the existing **Fort Worth Floodway**, Texas, a \$1,388,000 project, and a study will be made on proposed extension of the project.

San Angelo Reservoir, Texas, will be advanced from 19% to 60% of completion. The project, for the dual purpose of flood control and water conservation, will cost \$18,525,000. The year's work will be on construction of the earthen embankment, the spillway and the outlet works, relocation of railways, highways and utilities, and land acquisition.

The Gulf Intracoastal Waterway, which extends from western Florida to the Mexican border, will be further improved during the 1950 fiscal year. Along the Texas section, the year's work will include dredging in the Arroyo Colorado to the vicinity of Rio Hondo; deepening the tributary channel to Aransas Pass, and advance planning for conversion of



MAJ. GEN. LEWIS A. PICK, co-author of the Pick-Sloan Plan for Missouri Basin development, was appointed Chief of Engineers to succeed Gen. Wheeler in March, 1949.

the Colorado River Crossing floodgates into locks and reconstruction of the bridge across the main channel at Aransas Pass.

The Sabine-Neches Waterway, providing deep draft channels to Port Arthur and Beaumont, will be advanced in the current fiscal year by completion of construction on the Adams Bayou Channel and the Cow Bayou Channel.

The project to provide a 9-ft. navigation channel to **Liberty, Texas**, will be advanced from 1% to 19% of completion. The year's work will include dredging, construction for pumping plant, construction of a fresh water canal, bridge and highway construction, and relocation of pipelines. Cost of this project will be \$7,750,000.

Construction work will be initiated in the 1950 fiscal year on the **Jemez Canyon Dam and Reservoir**, New Mexico, a unit in the flood control phase of the comprehensive plan for the Rio Grande and tributaries. This is a \$7,201,000 project.

Arkansas-White River Basins

Construction work is being completed in the 1950 fiscal year on **John Martin Reservoir**, Colorado. The year's work included construction of facilities for reservoir management and public use. This project, costing \$15,080,000, provides storage for flood control and water conservation in eastern Colorado and western Kansas.

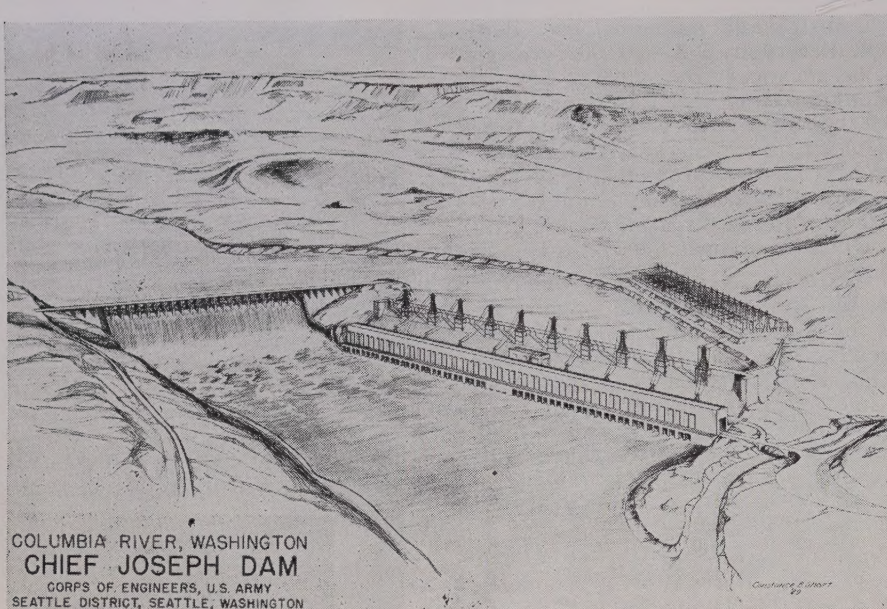
Similar wind-up work is also being done on **Canton Reservoir**, Oklahoma; **Fall River Reservoir**, Kansas; **Conchas Reservoir**, New Mexico; **Fort Supply Reservoir**, Oklahoma; and **Great Salt Plains Reservoir**, Oklahoma.

Fort Gibson Reservoir, Oklahoma, a dual-purpose flood control and power

The Ten Largest—

Of the 20 largest individual construction appropriations made by Congress for flood control and river and harbor work in the 1950 fiscal year, ten were for the western area, as follows:

McNary Lock and Dam, Oregon and Washington	\$35,000,000
Garrison Reservoir, North Dakota	27,500,000
Fort Randall Reservoir, South Dakota	23,000,000
Fort Gibson Reservoir, Oklahoma	12,000,000
Harlan County Reservoir, Nebraska	11,250,000
Whitney Reservoir, Texas	10,500,000
Detroit Reservoir, Oregon	9,500,000
Lookout Point Reservoir, Oregon	9,500,000
Pine Flat Reservoir, California	7,000,000
Los Angeles County Drainage Area (exclusive of Whittier Narrows Reservoir) California	6,500,000



COLUMBIA RIVER, WASHINGTON
CHIEF JOSEPH DAM
CORPS OF ENGINEERS, U.S. ARMY
SEATTLE DISTRICT, SEATTLE, WASHINGTON

PRELIMINARY excavation and construction contracts will be awarded early this year for Chief Joseph Dam, \$206,000,000 project on the Columbia River 51 mi. below Grand Coulee Dam.

project on the Grand (Neosho) River, will be advanced from 42% to 72% of completion during the 1950 fiscal year. Construction of the concrete dam, spillway and appurtenances will be completed during the year, along with clearing of the reservoir area. Continuing contracts will be awarded for construction of the powerhouse and switchyard. Cost of this project is \$45,900,000.

Hulah Reservoir, Oklahoma, a flood control and conservation project, will be advanced from 34% to 90% of completion during the 1950 fiscal year. The year's work will include construction on the dam, spillway and related facilities; land acquisition and relocations, and initiation of construction on the reservoir management and public use facilities. Cost of this project is \$12,282,000.

Planning and the initiation of preliminary construction work are scheduled during the 1950 fiscal year at **Oologah Reservoir**, Oklahoma, a unit in the Verdigris River Basin system, Kansas and Oklahoma, for flood control, water supply, pollution abatement and other conservation uses. This project will cost \$38,760,000.

The Polecat Creek project, Oklahoma, will be advanced from 45% to 93% of completion during the 1950 fiscal year. Construction of the dam will be completed during the year, and a continuing contract will be initiated for clearing of Polecat and Rock Creeks. This project will cost \$2,860,000.

Tenkiller Ferry Reservoir, Oklahoma, will be brought from 15% to 47% of completion during the 1950 fiscal year. This is a dual purpose flood control and power project, on the Illinois River, and will cost \$24,250,000. Work will continue this fiscal year on construction of the embankment, and related facilities, and on power features, and on land acquisitions. Relocations in the reservoir area will be initiated.

Wister Reservoir, Oklahoma, will be advanced from 84% to 94% of comple-

tion. This flood control project will cost \$11,055,000. Relocation and land acquisition and clearing of the reservoir area will be completed. Construction of reservoir and public use facilities will be continued.

Red-Ouachita River Basins

Texarkana Reservoir, Texas, a unit in the authorized reservoir-levee plan for alleviation of floods in the Red River Basin below Denison, Texas, will be brought to 30% of completion in the current fiscal year. By June, 1950, clearing of the damsite area and relocation of the electric transmission line there will be complete, and construction of the dam's north embankment section will be essentially complete. Work will be advanced during the year on access roads, utility alterations and land acquisition. Cost of this project is \$29,503,000.

Authorized work on the **Red River levees** and bank stabilization below Denison Dam, on the Texas-Oklahoma line, will be continued during the current fiscal year. Approximately 160 mi. of levee will be complete, representing 74% of this phase of the project; and bank protection will be 13% complete. The project will cost \$8,128,000.

Denison Dam, which is essentially complete, has an appropriation of \$650,000 for construction work in the 1950 fiscal year. The year's work will be on a second power unit; on reservoir management and public use facilities, and on placement of riprap on the right bank training wall below the dam. This dam will cost \$61,595,000.

Sacramento-San Joaquin River Basins

Pine Flat Reservoir, a multiple purpose project on Kings River, California, will be advanced from 8% to 27% of completion in the 1950 fiscal year. It will provide flood control, irrigation and other beneficial uses, and will have provisions for future power development. The 1950 fiscal year's work will include initiation of work on the main dam and

appurtenances and on permanent access roads, and relocations. This project will cost \$51,121,000.

Folsom Reservoir, on the American River, California, which will provide much needed flood protection for the capital city of Sacramento and adjacent metropolitan area, as well as have irrigation benefits and provisions for future power development, will be 9% completed by June 1950. The year's work will include initiation of contracts for the main dam diversion tunnel, excavation and construction of a by-pass and administration buildings. Cost of this project is \$50,792,000.

Isabella Reservoir, another unit in the comprehensive plan for flood control and other purposes in the Sacramento-San Joaquin Basin, will be advanced from 24% to 43% of completion during the 1950 fiscal year.

Work will also continue during the year on the **Cherry Valley Reservoir**, on the Cherry River; and on the **Farmingdale Reservoir**, on Littlejohn Creek. Other units in the basin plan.

The Sacramento River flood control project received an appropriation of \$3,600,000 for the 1950 fiscal year, which will bring this \$42,600,000 project to 93% of completion.

South Pacific, Arizona, Nevada and Utah Streams

Construction on **The Sacramento-Yolo Deep Water Channel**, designed to make Sacramento an ocean port 100 mi. inland from the Golden Gate, will be continued during the 1950 fiscal year. It was initiated in the 1949 fiscal year.

The San Diego River and Mission Bay project, an outstanding example of a program designed to provide needed small craft harbor facilities through cooperative efforts of the Federal Government and local interests, will be advanced during the year.

The Los Angeles County Drainage Area project, which has an overall Federal cost of \$301,605,600, which will provide flood protection for 325,000 ac. of highly developed residential, industrial and agricultural property, will be brought from 28% to 32% of completion.

Another major project in this group is **Whittier Narrows Reservoir**, a \$36,320,000 Los Angeles County project which will be advanced to 14% of completion by June 1950.

A CONSTRUCTION program valued at \$19,000,000 for 1950 has been announced by John E. Loiseau, President of the Public Service Company of Colorado. Of that total amount, \$7,400,000 would be spent in adding a third generating unit at the new Arapahoe steam generating plant at Denver, and \$1,600,000 would be used to add a 7,500-kw steam generator at the plant in Grand Junction. The remaining ten million dollars would be used for additions to the company's gas and electric distribution system.



U. S. 101 along the Pacific Coast in Oregon. Rough terrain is only one of the problems facing Western road builders.

Highways for 1950— Budgets Increased to Meet Demands

Arizona

THE 1949-1950 FISCAL construction budget for Arizona adopted June 30, 1949, by the State Highway Commission is as follows:

	Construction Authorized
State Primary System.....	\$10,700,574
State Secondary System.....	6,441,000
State Urban System.....	2,025,000
County FAS Projects.....	3,044,000
	\$22,210,574

Actual construction expenditures by the department during the fiscal year ending June 30, 1949, amounted to \$11,616,691 on state highways and \$1,589,533 on county FAS routes. This is a total of 12,751,224 spent in 1948-49 and the amount for 1949-50 will be approximately \$10,000,000.

According to the latest available estimate future requirements for construction of Arizona highways to adequate standards are approximately \$150,096,000.

The current budget assigns \$3,434,574 to U. S. Highway 66 across the northern portion of the state; \$1,650,000 to 69, the Black Canyon route, connecting Phoenix with Highway 66 over new alignment and incorporating present day standards of safety and economy; \$2,18,000 on the route connecting Phoenix and Tucson with a modern highway;

\$2,097,500 to portions of 666, the Coronado Trail, in areas south of its junction with U. S. 66 and in the Clifton-Safford section, and \$1,670,000 on route 70 for tunnel and bridge projects that connect Phoenix and Globe.

Two bridges on this section are now under construction. They are of the steel arch girder type, the arch measuring 350 ft. from pin to pin and 170 ft. from roadway to canyon bottom. Total cost of the two structures will be over \$1,000,000.

There has been a noticeable increase of interest by Arizona contractors in bidding on state highway jobs during the past year. With the available stock of planned projects, no difficulty is anticipated in submitting for bid all work that available State and Federal funds will allow during 1950.

W. C. Lefebvre is State Highway Engineer of Arizona.

1950 BUDGETS for highway construction in the West have bulged again to meet tremendous demands. Nine of the Western States have found it necessary to increase gasoline taxes to provide for added expenditures. This article summarizes current and planned construction programs of the states and Alaska.

California

THE CONSTRUCTION budget for California state highways during the 1950-51 fiscal year allocates \$61,702,000 for major construction projects and construction engineering, compared to a similar allocation of \$64,200,000 in the current 1949-50 fiscal year budget, a decrease of nearly \$3,000,000.

In addition to the funds budgeted for construction in the 1950-51 fiscal year there remains approximately \$18,000,000 from the 1949-50 fiscal year budget to be placed under contract between January 1 and June 30, 1950, making a total of \$80,000,000 available for construction between January, 1950 and June, 1951. During the first six months of 1950, there will be projects placed under contract from both fiscal year budgets as the Collier-Burns Act permits the advertising of projects contained in the 1950-51 fiscal year budget at such time that they can be awarded to contract on and after April 1, 1950.

The following is a brief description of some of the larger projects that are expected to be placed under contract in 1950 and the first half of 1951:

On the East Shore Freeway in Alameda County, a combined bridge and overhead is to be constructed at San Leandro Creek at an estimated cost of \$1,046,000.

In Contra Costa County on State sign

routes 4 and 24 between Port Chicago Road and Pittsburg, grading, paving and structures at an estimated cost of \$1,405,200.

On the Hollywood Parkway in Los Angeles County, grading and paving between Virgil Avenue and Western Avenue and the Hill Street Overcrossing estimated to cost \$3,685,000.

On U. S. 99 in Los Angeles County between Frenchman's Flat and Alamos Creek, grading, paving and structures at an estimated cost of \$1,870,000.

On U. S. 99 in Los Angeles County between 0.4 mi. south of Castaic Creek and 0.4 mi. north of Palomas Wash, grading, paving and structures estimated to cost \$1,206,000.

In Los Angeles County on Rosemead Boulevard between Garvey Avenue and Valley Boulevard, grading, paving and structures estimated to cost \$1,154,000.

In Orange County on U. S. 101 Bypass between Los Angeles County Line and Miraflores, grading and paving estimated to cost \$1,425,000.

In Alameda County on U. S. 50 between 1½ mi. west of Livermore and Hopyard Road, grading, paving and structures estimated to cost \$1,237,600.

In Alameda County on East Shore Freeway between Lewelling Boulevard and 0.1 mi. north of south city limits of Oakland, grading, paving and structures estimated to cost \$4,524,800.

In Alameda County on State route 226 Bayfarm Island, bridge and approaches estimated to cost \$1,570,200.

In Del Norte County on U. S. 101 between Smith River Bridge and ¼ mi. north of Winton Corners, grading and structures estimated to cost \$537,600.

In El Dorado County on U. S. 50 between railroad crossing and Five Mile Terrace, grading and surfacing estimated to cost \$408,800.

In Imperial County on State sign route 111 between Niland and Riverside County line, grading and surfacing estimated to cost \$616,000.

In Kern County on U. S. 99 between Los Angeles County line and Ft. Tejon, grading, paving and structures estimated to cost \$1,232,000.

On Hollywood Parkway in Los Angeles between Alameda Street and Highland Avenue, grading, paving and structures estimated to cost \$6,138,700.

In Los Angeles and Ventura Counties on U. S. 101 between 1.6 mi. west of Malibu Junction and 1 mi. west of Moorpark Road, grading, paving and structures estimated to cost \$1,904,000.

In Los Angeles County on Santa Ana Parkway between Eastman Avenue and LaVerne Avenue, grading, paving and structures estimated to cost \$2,348,600.

In Los Angeles County on U. S. 99 between 2½ mi. south of the junction of State sign route 138 and Kern County line, grading, paving and structures estimated to cost \$1,456,000.

In Los Angeles County on Harbor Parkway between Adobe Street and Olympic Boulevard, grading, paving and structures estimated to cost \$2,413,600.

In Los Angeles County on Ramona Parkway between 0.2 mi. east of Helen Drive and Hellman Avenue, grading, paving and structures estimated to cost \$1,757,200.

In Los Angeles County on Santa Ana Parkway between Eastland Avenue and Lakewood Boulevard, grading and structures estimated to cost \$2,912,000.

In Marin County on U. S. 101 between Ignacio and Forbes Overhead, grading, surfacing and structures estimated to cost \$1,120,000.

In Sacramento County on the new Bypass route between U. S. 99 and U. S. 40, a bridge substructure is to be constructed over the American River near Elvas Junction at an estimated cost of \$985,600.

In San Bernardino County on State routes 207 and 43 between 1.3 mi. west of Running Springs to Running Springs, grading, surfacing and structures estimated to cost \$672,000.

In San Francisco on U. S. 101 between U. S. 101 Bypass and South Van Ness Avenue, separation structures estimated to cost \$1,120,000.

In San Francisco on U. S. 101 Bypass between 25th Street and Bryant Street, structures and ramps to be constructed at an estimated cost of \$1,114,400.

In San Luis Obispo County on U. S. 101 between Atascadero and 1 mi. south of Templeton, grading, surfacing and structures estimated to cost \$1,064,000.

In Santa Barbara County on U. S. 101 between 0.5 mi. north of Las Cruces and 1 mi. north of Summit, grading and surfacing estimated to cost \$980,000.

In Siskiyou County on U. S. 99 between Spring Hill and Weed, grading and surfacing estimated to cost \$616,000.

In Tehama County on U. S. 99W between Glenn County line and Proberta, surfacing and widening structures estimated to cost \$599,200.

In Tulare County on U. S. 99 between Tulare Airport and Tagus, grading and structures estimated to cost \$1,176,000.

In Yolo County on U. S. 40 and U. S. 99W between Yolo Causeway and Tower Bridge, grading and structures estimated to cost \$1,041,600.

G. T. McCoy is State Highway Engineer of California.

Colorado

THE 1950 state highway budget for Colorado calls for a record \$17,638,562 in new construction. The breakdown on major budgeted items is as follows: Primary roads, \$7,894,379; urban roads, \$3,080,016, and secondary and state projects, \$6,547,000. Colorado's budget for highway construction in 1949 totaled \$15,857,913.

Major projects approved by the state highway advisory board for construction during 1950 include the following: Grading and structures on S. H. 185, Denver-Castle Rock, \$1,300,000; grading and structures on S. H. 20 in Jefferson

County, \$798,501; grading and surfacing on S. H. 14 in Larimer County, \$674,675; grading and structures on S. H. 185 north from Denver, \$550,000; grading and structures on S. H. 182 east and west of Golden, \$700,000; grading and structures on S. H. 8 east and west of Conifer, \$385,000; grading, structures and surfacing on S. H. 2 southeast of Steamboat Springs, \$350,000; grading, structures and surfacing on S. H. 10, Durango-Hesperus; stabilizing and surfacing on S. H. 10 east and west of Wolf Creek, \$325,000; bridge and grading and surfacing in Fremont County, \$300,000; grading, surfacing and structures on S. H. 4 east and west of Palisade, \$300,000, and grading and surfacing on S. H. 17 in Saguache and Alamosa Counties, \$320,000.

The budget spreads funds for work on 109 separate projects and matches all available federal aid. A significant development was the greater responsibility assumed by the counties for local road improvements.

Mark U. Watrous is State Highway Engineer of Colorado.

Idaho

DURING the 1949 construction season, 107 contracts for highway construction in Idaho were completed, amounting to approximately \$6,666,600; 29 contracts totaling approximately \$4,512,000 will be carried over to the 1950 season. Many of these are nearing completion and several have recently been let but little or nothing will be done on them until spring.

For the 1950 construction season, 92 projects are programmed, estimated to cost approximately \$12,000,000.

Contract work will include:

Portland cement concrete pavement	2.5 mi.
Bituminous mixes and treatments	301.0 mi.
Gravel surface	78.0 mi.
Other types	80.0 mi.
Major bridges to be repaired	1
Major bridges to be constructed	6
Grade separations to be constructed	1

In addition, there are projects involving cooperation between the State, Bureau of Reclamation, Army Engineers and Atomic Energy Commission that are in a preliminary stage but may possibly be constructed in 1950, involving approximately \$3,000,000.

Maintenance funds have not been budgeted as yet but will approximate \$3,000,000.

James Reid is Idaho Director of Highways.

Montana

A STATE highway construction program is planned for Montana for the calendar year 1950 in the approximate amount of \$16,000,000. This represents a substantial increase over the construc-

tion programs of previous years which were \$12,592,000 and \$11,579,000 for the years of 1948 and 1949, respectively. The program, which will be accomplished with Federal Aid, will cover work upon the primary, the secondary, and the urban systems.

The state's share of the 1950 program will be financed in large part with the last remaining funds from the sale of previously authorized debenture bonds. With the exhaustion of the debenture bond money, future programs for the year 1951, and thereafter, will be reduced to approximately \$8,000,000 per year unless the state highway revenues are materially increased in the meantime.

An Interim Highway Committee, appointed some months ago by Governor John W. Bonner, is making an intensive study of Montana's highway needs, and is working upon plans to be recommended to the next legislature, whereby additional revenues for highway construction purposes may be provided. Montana's state highway construction program will have to be greatly increased over that of former years, if the needs of the state are to be adequately served.

In addition to the Federal Aid program, handled by the State Highway Commission forces, as discussed above, there is planned for expenditure during 1950, under the direct supervision of the Bureau of Public Roads, an approximate \$1,250,000 of Forest Highway funds for the improvement of those sections of the Federal Aid Highway system which are located within the National Forests. It is anticipated that the state maintenance program for 1950 will cost approximately \$6,000,000, of which the sum of \$400,000 is earmarked for the purchase of new equipment.

C. E. Stahl is State Highway Engineer for Montana.

Nevada

DURING the calendar year 1949, 19 road construction contracts were let by the Nevada Department of Highways covering 209 mi. of construction, according to C. V. Melarkey, office engineer. The total of low bids on the above jobs was \$4,067,768. Of this total, 38.7 mi. were gravel surfaced, 37.5 mi. were plant-mix bituminous surfaced, and 132.8 mi. were roadmix bituminous surfaced. Total contract construction expenditures for the year including engineering and carry-overs from the previous year were \$5,036,846. Maintenance and construction expenditures by State forces amounted to a total of \$1,773,435.

For the coming year of 1950, construction of a comparable mileage at an expenditure of approximately \$5,800,000 for contract construction and about \$1,600,000 for maintenance by state forces is anticipated.

Of the projects programmed for 1950, two are of the 4-lane divided type, one being a 2.5 mi. extension of the project south of Reno on U. S. 395 making a total of 5 mi. of 4-lane highway entering Reno from the south, which will greatly



BY-PASS STRUCTURES combining efficiency and pleasing appearance are being constructed on major routes throughout California. Illustrated is a structure on U. S. 101 near San Mateo.

improve traffic conditions through this section. The other is in the city of Las Vegas, a length of 2.8 mi. to relieve traffic conditions on U. S. 91.

Between 20 and 30 mi. of the interstate system and a like mileage on the primary system will be reconstructed to present required standards, including widening of a railroad underpass at Fernley on U. S. 40. Secondary roads will absorb the remainder of available funds.

W. T. Holcomb is State Highway Engineer of Nevada.

New Mexico

IT IS EXPECTED that the 1950 construction program for the New Mexico State Highway Department will surpass that of the 1949 program by \$2,000,000, according to L. D. Wilson, administration engineer.

The 1949 New Mexico State Legislature increased the gasoline tax from 5 cents to 7 cents a gallon, with the increased 2 cents earmarked for debt retirement. However, certain interests in the state backed a referendum petition to knock out the Legislature's action. Although the New Mexico Supreme Court ruled that the increased tax was not subject to referendum, the resulting activities delayed the highway program three or four months until the outcome could be determined.

This placed the 1949 program behind schedule, and it is planned to attempt to pick up this slack and, in addition, to go ahead with a regular size program. This means a program of, roughly, \$16,000,000 of new construction, in cooperation with the Bureau of Public Roads.

The most significant items in the 1950 program are a group of projects designed to bring U. S. Highway 66 in eastern New Mexico up to the standards necessary to accommodate the traffic on this highway. Over \$2,500,000 will be expended towards this end, with projects which will provide a 1½-in. hot-plant mix on top of an asphalt stabilized

base, a higher grade of pavement than built in the past.

Work started in 1949 towards the ultimate goal of bringing U. S. 70-80 up to standard, and will be carried on in the 1950 program.

Federal Aid Secondary money will be spread over many small projects to build farm-to-market roads to serve as many people as possible. It is expected that 45 projects will be built under this category.

During 1950 the department plans to construct an urban project at Las Vegas, to cost about \$1,250,000, which will do much towards alleviating the traffic conditions in that community.

There are no tunnel projects anticipated for the 1950 program, and possibly only one major bridge, across the Rio Grande on U. S. 380 at San Antonio. No projects have been scheduled for new bridges across the Rio Grande at Albuquerque, but traffic conditions may force us to widen those structures before the year is out.

B. G. Dwyre is State Highway Engineer of New Mexico.

Oklahoma

A \$45-MILLION highway program is forecast for Oklahoma in 1950. The Oklahoma state highway commission has submitted \$17,084,355 in federal aid projects to Public Roads Administration for approval, including:

Post-war federal aid.....	\$8,743,855
State aid	5,640,500
Pre-war grade separation.....	365,000
Post-war urban	2,010,000
Post-war urban grade crossing	325,000

Next year's activities include work already programmed for primary road construction, state and urban projects, farm-to-market roads and grade separation projects.

Coupled with \$65,600,000 in projects contracted since Jan. 1, 1947, it is predicted that the present Oklahoma state administration would complete its four

years in office at the close of 1950 with a road building record of well over \$100,000,000, highest for the period in state history.

H. E. Bailey is State Highway Director of Oklahoma.

Oregon

OREGON'S highway budget for 1950 allots to highway construction, exclusive of rights of way, the sum of \$15,250,000. Of this amount, \$10,000,000 will be required to meet payments on contracts already awarded. The remaining \$5,250,000 will be expended on \$13,500,000 of work to be contracted during 1950.

The 1950 expenditure for construction will exceed the 1949 expenditure by \$2,250,000, this increase being made possible by recently authorized increases in gasoline tax and motor vehicle registration fees. The gasoline tax is increased from 5 cents to 6 cents per gallon. The registration fee for passenger cars and pickups is increased from \$5 to \$10 per vehicle.

Of Oregon's federal aid program for the fiscal years 1950 and 1951, which program totals \$21,200,000, \$7,100,000 or 33 per cent is under contract as of January 1. Contracting of the balance of this program will be completed early in 1951.

One of the larger contracts to be let early in 1950 involves grading, paving and structural work on a unit 0.4 mi. in length on the Harbor Drive expressway in the City of Portland. This contract is expected to cost about \$680,000. A later contract will be for a bridge over the Willamette River at Salem, estimated at \$1,200,000.

Other major projects scheduled for 1950 include the following: Grading and paving of U. S. 101 at Coos Bay in Coos County, estimated at \$250,000; grading of U. S. 99, Canyonville-South, Douglas County, \$520,000; grading and bituminous macadam paving, U. S. 97, Barclay Springs-Algoma, Klamath County, \$825,000; grading of U. S. 30, Ladd Canyon-North Powder, Union County, \$900,000; grading and paving U. S. 101, Chrome Plant-Coquille, Coos County, \$650,000; grading and bituminous paving of U. S. 30, Viento-Mitchell Point, Hood River County, \$370,000; structures, grading and paving on U. S. 99E, Portland (Columbia Slough-North) Multnomah County, \$400,000, and grading and bituminous macadam paving of U. S. 30, Heppner Junction-Boardman, Morrow County, \$590,000.

R. H. Baldock is State Highway Engineer of Oregon.

Washington

THE INCREASE of 1½ cents in the state collected gas tax and a two dollar per vehicle increase in the cost of motor vehicle license fees, enacted by the 1949 legislature, gives the Department of Highways and the counties of the State of Washington more dollars to spend on road construction and maintenance than

they have ever had before. However, these increases are not sufficient to overcome the rise in construction and maintenance costs that have taken place during the past eight years; hence the volume of construction work that can be carried out during the current biennium will be considerably smaller than that performed during the 1939-1941 biennium and other bienniums, prior to this country's entry into the second World War, according to Norman Hill, Work Control Engineer.

Moreover, the unusually severe winter experienced in western Washington a year ago resulted in extraordinary damage to highways and roads and consequent heavy repair costs which were not anticipated when the 1949-1951 construction budget was presented to the state legislature early in January, 1949.

Nevertheless, the State Department of Highways has a large number of important jobs to offer for contract in 1951. Work will continue on the modernization of the Pacific Highway between the Kalama River and the City of Centralia, and will include paving between the Kalama River and the Longview Wye and between the town of Ostrander and the Toutle River, where grading is now under way, and grading northerly from the Toutle River. In the same neighborhood, a contract has already been let that will bring about the construction of the piers for the new Cowlitz River Bridge at Kelso and the building of the bridge superstructure will be offered for contract before July 1, 1951.

Among other important 1951 construction projects, scattered throughout the state, are the Alaskan Way Viaduct in the City of Seattle; reinforced concrete snowsheds west and east of Snoqualmie Pass; a new bridge crossing the Snake River east of Pasco; relocation and construction of a large part of Primary State Highway No. 3 between the site of that bridge and the Wallula Junction and from the junction southerly to the Oregon state line, made necessary by the building of the McNary Dam.

Also, the Paha to Ritzville section of Primary State Highway No. 11, in Adams County; the Pend Oreille River Bridge at Metaline Falls; the Bridgeport to Leahy section of Primary State Highway No. 10 in Douglas County; the Nooksack River Bridge and approaches in Whatcom County; the reconstruction of the Ponders to Dupont section of the Pacific Highway in Pierce County; a portion of the Vancouver Freeway in the City of Vancouver; the Broadway Cut-off in the City of Everett; the Columbia River Bridge approaches at Wenatchee; grading and bridge construction on Primary State Highway No. 2 in the vicinity of Woodinville, King County; grading and a railroad undercrossing in the vicinity of Loon Lake in Stevens County; grading and surfacing in the vicinity of Pullman in Whitman County; between Fern Gap and Morton on Primary State Highway No. 5 in Lewis County; between Wilson Creek and Lincoln County Line in Grant County; between Contractor's Gulch and Clallam County Line in Jefferson

County and from Oroville southerly for a distance of ten miles in Okanogan County.

W. A. Bugge is Director of Highways for Washington.

Wyoming

THE 1950 PROGRAM for Wyoming will be similar to the one of the year past. Naturally, this is predicated upon there being no congressional action, particularly on secondary roads, and the 1951 Federal Aid being left as it is. This program in Wyoming will amount to slightly over \$10,000,000 but at least one-fourth of that must be used for maintenance purposes, according to John E. Wiley, public relations engineer.

No program of construction has been completed at this time. However, a contract should be awarded for a new bridge across the Platte River at Orin Junction and it is hoped that at least by early winter, a bridge across the Green River on the Big Piney East Road in Sublette County will also be under contract. This latter project was programmed for 1949, but due to the delays encountered in structural design and contracting, the work will be accomplished during the ensuing year. There are two or three other bridges planned but plans have not crystallized and these structures will be smaller than those mentioned.

The 1950 program will provide some benefit over the entire state, but it is going to take many years, according to Wiley, before this volume can even begin to make a mark on the need. There is demand for planning for traffic 20 years hence, but the highway administrator is always sharply curtailed in accomplishing these plans on account of the vast amount of moneys required to balance the general system, not for 20 years hence but for today.

J. R. Bromley is superintendent of the Wyoming Highway Department.

Texas

SCHEDULED to be contracted during 1950 by the Texas Highway Department are about 300 mi. of primary and urban work and about 3,500 mi. of rural roads. Almost half of the rural construction will be made possible by the allocation by the Texas Legislature in 1949 of \$15,000,000 per year for the next two years for farm-to-market road building. This is in addition to the federal secondary program which will provide about 1,400 mi. of rural roads next year, according to Fred T. Bennett, Engineer, Traffic Services.

Major projects listed include:

1. Urban expressway construction costing about \$3,000,000 to extend present limits within city of Dallas.

2. On the LaPorte-Baytown tunnel project under the Houston ship channel, construction is now under way for the 2-mile tunnel and hydraulic fill. Approach paving and construction of the ventilation building will probably be let



EXTENSIVE grading over long stretches of rough terrain requires a variety of heavy equipment for Western highway construction. Illustrated is the construction of a box culvert by Peter Kiewit Sons' Co. for highway relocation on the Grand Coulee Irrigation Project in Washington.

on contract during the current year.

3. Grading and structures costing approximately \$300,000 between Gregory and Portland and running up to the hydraulic embankment on the Nueces Bay Causeway project are scheduled for contract in 1950.

4. The Gulf Freeway project in Houston has approximately \$1,000,000 in work ready for contract. Around \$4,000,000 in paving remains to be done on the 4-lane U. S. 75 running from Houston to Galveston.

5. The Sulphur River bridge between Texarkana and Atlanta on U. S. 59 should draw bids of over \$500,000.

6. A \$600,000 storm sewer in Beaumont to provide drainage for the Beaumont expressway will be among 1950's projects.

7. The first increment of the Valley Expressway between Mission and Pharr is now awaiting purchase of right-of-way. The initial increment calls for an expenditure of over \$1,000,000 on U. S. 83.

8. The interstate route through Austin of U. S. 81 should all be let in 1950. The 2-mi. segment will cost over \$1,000,000.

9. The entrance of U. S. 66 into Amarillo from the west will cost over \$500,000.

10. The north-south and east-west expressways in Fort Worth have about \$3,500,000 in work outstanding which will likely be placed in 1950.

11. Widening the road from Midland to Odessa to four lanes will cost approximately \$1,000,000.

12. U. S. 81 through Hillsboro to Itasca on relocation will cost about \$1,750,000.

13. Additions to the San Antonio ex-

pressway will call for expenditure of about \$2,000,000.

D. C. Greer is State Highway Engineer of Texas.

Alaska

DURING 1949, a large program of road work in Alaska was carried out by the Alaska Road Commission. This included hard surfacing of main highways, major improvements of other existing roads, and much new construction.

Since 1905, the Alaska Road Commission has built and now maintains 2,981 mi. of roads in the Territory. Of this mileage, 934 mi. of through roads include the northern end of the Alaska Highway from the United States to Fairbanks, and its main extensions to the south coast ports of Anchorage, Valdez, and Haines. Now connected with this system of through roads are 356 mi. of feeder or secondary roads and 564 mi. of local or third class roads, making a total of 1,854 mi. of highway now connected with the Alaska Highway and thence, through Canada, with the United States.

During the past year, 148 mi. of through roads extending eastward from Anchorage and Fairbanks were paved with a light bituminous surface. In addition, another 150 mi. are now under contract for paving and will be completed in 1950. It is planned to ultimately pave all of the through roads of Alaska so that one may travel from the Alaska border to Fairbanks, Anchorage, and

Valdez over continuously paved highways. This program will cost approximately \$45,000,000 and is partially dependent upon funds not yet appropriated.

To provide asphalt for the surfacing program, two large asphalt storage plants were installed by the Alaska Road Commission at the south coast ports of Valdez and Anchorage. This permits the delivery to Alaska of asphalt in bulk by ocean-tanker. In these plants the asphalt is kept hot so that it can be easily handled by the contractors' tank trucks from the asphalt plants to the job, often several hundred miles inland. Paving is done only during the warm summer season.

Important reconstruction work during the 1949 working season included the completion to all-weather, gravel standard of the road extending northwestward from Fairbanks to Livengood, 85 mi., and much improvement work upon the Tok Cutoff and the Richardson Highway.

Important new road construction carried out during the past season included the Turnagain Arm Road, 71 mi. long, which will connect Seward and the Kenai Peninsula with Anchorage and the main highway system. This work is now under contract by the Bureau of Public Roads and The Alaska Railroad, with completion scheduled for the summer of 1951.

The new Sterling Highway extending 120 mi. down the west side of the Kenai Peninsula is planned for final completion by summer of 1950. This is a part of the main Kenai Peninsula system which will be linked with Anchorage by the completion of the road along Turnagain Arm.

Construction will begin in 1950 on a new road 150 mi. long designed to con-

nect the main road system from a point near Paxson's Lake with the Mt. McKinley National Park. This road will require several years for construction. Ultimately, it will tap the region served by The Alaska Railroad at Cantwell and connect with 95 mi. of existing road at McKinley Park Station.

An important program for the construction of local farm and industrial roads is also under way. This already includes about 300 mi. of secondary and third class roads in the Fairbanks, Anchorage, Palmer, and Homer areas.

West Obtains Most of Funds for Forest Roads

A TOTAL of \$17,686,581 is apportioned to the West's states and Alaska from the entire \$20,000,000 fund authorized by the Federal-aid Highway Act of 1948 for the fiscal year 1951, for the improvement of highways in national forests.

The Federal-aid Highway Act of 1948 authorized appropriations of \$20,000,000 for national forest highways in each of the fiscal years 1950 and 1951. The apportionment for the 1950 fiscal year was made in June, 1948. The apportionment is made on the basis of area and the value of the land owned by the Government within the national forests in each state. The 1951 fiscal year begins on July 1, 1950.

Expenditure of Federal funds for forest highways is administered by the Bureau of Public Roads of the U. S. Department of Commerce. National forest highways are selected for improvement on the basis of joint recommendations made by state highway departments, the

These roads are being progressively extended year by year to serve the needs of settlers.

Future work toward the improvement and extension of Alaska roads is contained in a 6-yr. plan approved by the U. S. Department of the Interior, under which the Alaska Road Commission operates. This program, revised annually, is designed to keep pace with policies for the general development of Alaska and with local needs. Construction of such roads depends upon future appropriation of funds.

Forest Service of the Department of Agriculture, and the Bureau of Public Roads. Public Roads is responsible for practically all construction.

Forest highway funds apportioned to the states of the West and Alaska for the fiscal year 1951 are as follows:

State	Sum Apportioned
Arizona	\$1,137,825
California	2,856,198
Colorado	1,434,994
Idaho	2,040,877
Montana	1,589,904
Nebraska	21,681
Nevada	359,115
New Mexico	810,483
North Dakota	82
Oklahoma	15,717
Oregon	2,753,489
South Dakota	181,308
Texas	73,555
Utah	664,834
Washington	1,391,825
Wyoming	854,694
Alaska	1,500,000
Total	\$17,686,581

Federal Funds for 1951 Now Available to States

A TOTAL of \$136,810,555 is apportioned to the West's states from the \$450,000,000 fund authorized by the Federal-aid Highway Act of 1948 for the fiscal year 1951, for improvements on Federal-aid primary, secondary and urban routes.

The Act authorizes an appropriation of \$450,000,000 for each of the fiscal years 1950 and 1951 to assist the states in continuing the postwar highway program for which initial appropriations were made under authorization of the Federal-aid Highway Act of 1944. The apportionment was made according to formulas stated in the Act of 1944. Figures for the 1950 Fiscal Year Apportionment may be found in the Jan. 15, 1949, *Western Construction News*, page 78.

Under provisions of the 1948 Act, as in the previous Act, 45% of the total authorization must be expended for projects on primary roads in the Federal-aid system (including urban extensions), 30% for the improvement of routes in the Federal-aid secondary system, and 25% for work on Federal-aid highways in urban areas having a population of 5,000 or more. The states are required to match the Federal funds.

The funds are to be administered by the Bureau of Public Roads of the U. S. Department of Commerce in cooperation with state highway departments according to the usual Federal-aid procedure. Under provision of the law all projects are initiated by state highway departments, which also prepare plans,

Oklahoma Truck Load Limit Increases Highway Revenue

OKLAHOMA's new truck load limit law has produced more than \$100,000 revenue in the first six months of its operation.

The revenue comes from permits issued for loads exceeding the law's maximum 60,000-lb. weight. Operators pay a fee of \$5 for every 1,000 lb. above the maximum.

The 1949 Oklahoma Legislature passed the law as a means of curbing highway damage by overloaded vehicles. Prior to its passage the state had no weight limit.

State Highway Director H. E. Bailey is of the opinion that the new statute has greatly lessened highway damage.

Nevada Group Offers Loan For Utah Paving Project

THE CHAMBER of Commerce and Mines of White Pine County, Nev., has offered to make an interest-free loan of \$250,000 to the state of Utah, to be used to pave the 51.6-mi. stretch of Highway 6 from Hinkley, Utah to the Nevada line. According to the Chamber, this is the only remaining unpaved stretch of the highway which officially reaches from Cape Cod, Mass., to Long Beach, Calif.

J. Bracken Lee, Governor of Utah, announced that he was very pleased with the spirit of the citizens of eastern Nevada, and would refer the offer to the state's attorney general to determine if it is legally possible for Utah to accept such a loan.

let contracts and supervise construction, all subject to Federal approval. The apportionment for the fiscal year 1951 became available on October 1, 1949, and will remain available to the states until June 30, 1953.

Amounts apportioned to the West's states are tabulated herewith.

Allotments of Federal Highway Funds to the West 1951 Fiscal Year Apportionment

State	Federal-Aid Primary System	Secondary or Feeder Roads	Urban Highways	Total
Arizona	\$ 2,884,918	\$ 1,995,026	\$ 232,926	\$ 5,112,870
California	8,037,278	4,602,788	7,216,292	19,856,358
Colorado	3,575,649	2,406,251	829,510	6,811,410
Idaho	2,471,847	1,728,865	188,176	4,388,888
Kansas	4,956,553	3,481,866	983,721	9,422,140
Montana	4,051,448	2,767,823	273,348	7,092,619
Nebraska	3,944,850	2,785,550	695,466	7,425,866
Nevada	2,562,973	1,717,361	53,853	4,334,187
New Mexico	3,231,155	2,236,700	228,567	5,696,422
North Dakota	2,948,287	2,125,686	190,644	5,264,617
Oklahoma	4,490,377	3,298,766	1,197,791	8,986,934
Oregon	3,325,613	2,269,150	720,430	6,315,193
South Dakota	3,109,459	2,214,296	197,342	5,521,097
Texas	12,683,893	8,933,674	3,966,153	25,583,720
Utah	2,265,127	1,508,492	385,353	4,158,972
Washington	3,142,071	2,127,490	1,303,754	6,573,315
Wyoming	2,470,864	1,676,874	118,209	4,265,947
Total	\$70,152,362	\$47,876,658	\$18,781,535	\$136,810,555

Largest Construction Program in 47 Years Under Way by— Bureau of Reclamation in 1949, 1950

Construction activity by the USBR in the West has reached an all-time high—Major projects of the unprecedented program are briefly described in this article

AN UNPRECEDENTED West-wide construction program, by far the largest in the Bureau of Reclamation's 47-year record of water resources development, is the challenging responsibility confronting the Bureau this current fiscal year (July 1, 1949 to June 30, 1950). Total appropriation for the year approaches \$387,000,000.

Among the notable accomplishments made during 1949 were the completion of the O'Sullivan, South Coulee, and Long Lake Dams on the Columbia Basin Project; the initial delivery of water to lands under the Friant-Kern Canal on the Central Valley Project; the beginning of water storage in Granby Reservoir on the Colorado-Big Thompson Project; the virtual completion of Angostura, Enders, Medicine Creek, and Heart Butte Dams on the Missouri River Basin Project; and the completion of the earth-fill embankment of Davis Dam.

The following are brief summaries of the major construction highlights on projects in the seven regions of the Bureau included under the current program, as well as major construction activity that is planned for the remainder of the fiscal year.

Region 1

Columbia Basin Project, Washington

The increased tempo of work on the Columbia Basin Project is aimed at having canals and other structures sufficiently advanced to meet the current schedules for approaching large-scale irrigation developments. Completion of O'Sullivan, South Coulee and Long Lake Dams this year, and the virtual completion of reaches of the Main Canal, mark significant progress in the construction of features in the development for the irrigation system of the project. Total appropriation for the project for the 1950 fiscal year is \$79,148,757.

O'Sullivan Dam, an 8,620,000 cu. yd. earthfill structure, was completed in August. This dam comprises about 19,000 ft. of nearly continuous embankment of varying height up to approximately 200 ft. **South Coulee Dam** was completed in September. This feature, which serves as the southern impounding barrier of the Grand Coulee Equalizing Reservoir, is 63 ft. high above the floor of the Grand Coulee and 9,880 ft. long at the crest, and contains about 1,661,000 cu. yd. of earth and rock fill.

Long Lake Dam was completed last January. An earthfill structure, the dam

rises 110 ft. above streambed and is 1,900 ft. long at the crest and has a volume of about 1,457,000 cu. yd.

Construction of about 2 mi. of the 16,000-cfs. **Feeder Canal** was begun last May. This work is an addition to the $\frac{3}{4}$ -mi. long reach of the canal now under construction. Work was begun last May, also, on the **North Coulee Dam**. This earthfill structure, 145 ft. above the foundation, and 1,400 ft. long at the crest, is to serve as the northern dam of the Equalizing Reservoir.

A 4-mi. reach of the **Main Canal**, (initial capacity, 13,200 cfs.) which includes the **Bacon Tunnel** and **Bacon Siphon**, and a $6\frac{1}{2}$ -mi. reach of the canal below Long Lake Dam, are virtually completed.

The first section of the **West Canal** (5,100-cfs. capacity), about $6\frac{1}{2}$ mi. long, was completed in October. This reach of the canal includes the **Dry Coulee Siphons**, about 1 mi. in length. Construction on the second section of the canal, about 14 mi. in length, was started last April. Present plans call for construction of the third section, about $15\frac{1}{2}$ mi. to start in early spring. Construction of the 25-ft. steel-lined, reinforced concrete

Soap Lake Siphon, an important feature of the West Canal, is more than half completed.

The first section of the **East Low Canal**, about 12 mi. in length, is virtually completed. Construction on the contract for the mile-long second section, and the $6\frac{1}{2}$ mi. **Rocky Coulee Wasteway**, was begun in June. It is expected that the 13-mi. third section, and the 3-mi. long reach of the **Weber Wasteway**, will be placed under construction early this spring.

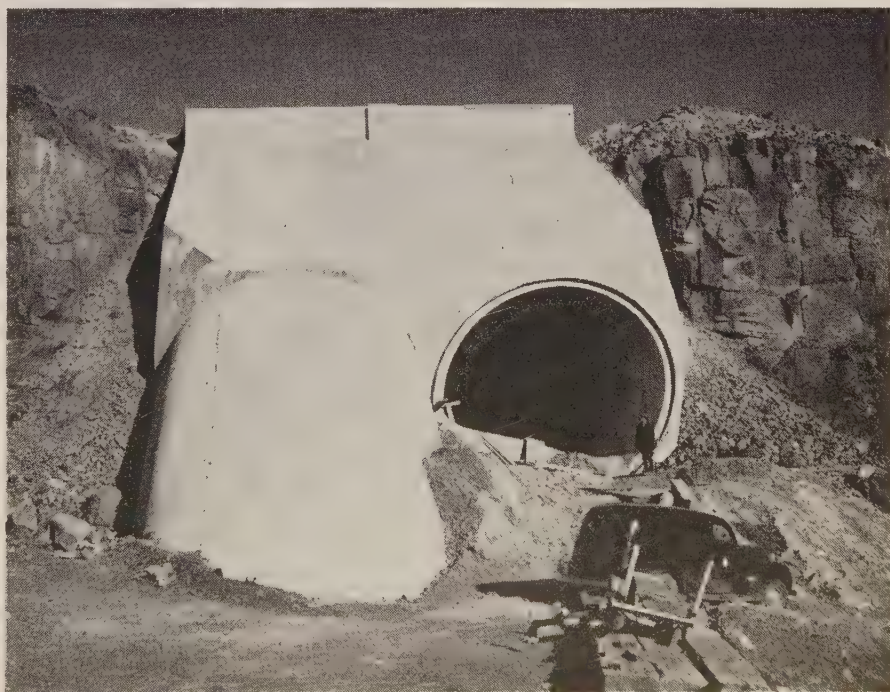
A contract for construction of the first section of the **Potholes East Canal**, about 9 mi. in length, was awarded in October. Invitations are to be issued next spring for construction of an additional 17-mi. section. The 18-mi. long **Winchester Wasteway** (4,200-cfs. capacity) was begun last August.

Invitations for major repair work of the spillway face and spillway bucket at Grand Coulee Dam are to be issued by early summer.

The installation of the first three 108,000-kw. generators in the right powerhouse of the **Grand Coulee Power Plant** this year is an important accomplishment in the development of the project's hydroelectric facilities to an ultimate capacity of 2,300,000 kw.

Construction of the **Grand Coulee Pumping Plant** is about 50% completed. Housing 12 vertical shaft centrifugal pumps that will have a rated capacity of 1,350 cfs. each at a pumping head of 310

THE TEMPO of work on the Columbia Basin Irrigation Project is increasing. The completed Main Canal will discharge through the inlet structure shown below into the completed barrel of the Bacon Siphon, which disappears underground. Another barrel will be added later.



ft., the pumping plant will enclose the world's largest pumping installation. Contracts for six pumps and six 65,000-hp. electric motors that are to drive the pumps were awarded during 1946. Construction schedules for development of irrigation facilities call for the first 2 pumps to be placed in operation in May, 1951.

F. A. Banks is District Manager for the Columbia River District; H. A. Parker is Supervising Engineer for the Irrigation Division; and Alvin Darland is Supervising Engineer for the Coulee Dam Division.

Boise Project, Idaho

Construction of the spillway and power plant for **Anderson Ranch Dam** is about 70% complete. Award of the contract for installation of electrical, mechanical and hydraulic equipment in the power plant, outlet works and switchyard, including two 18,500-hp. vertical shaft turbines and two 15,000-kva. generators, is expected to be made early this year. **Anderson Ranch Dam**, completed early in 1948, is the highest earthfill dam in the world. It is located on the South Fork of the Boise River about 40 mi. southeast of Boise. The dam is 456 ft. in height above rock foundation and 1,350 ft. in crest length. Some \$3,620,000 will be spent this year. G. A. Swanson is Construction Engineer.

Construction of the earth and rockfill embankment of **Cascade Dam** was completed in Nov., 1948. Installation of gates and outlet pipes was completed in May, 1949. Clearing of the remainder of the reservoir area is to be completed this year. Appropriation this year is \$2,285,470. Earl Harmon is Construction Engineer.

Hungry Horse Project, Montana

Approximately 60,000 cu. yd. of concrete has been placed in **Hungry Horse Dam** since placement was first begun in September. The concrete work on the 564-ft. multiple-purpose structure, which will be the third highest dam in the world, has been suspended for the winter but will be resumed early next spring. A goal of 1,000,000 cu. yd. has been set for the 1950 construction season. Operation of the first of the four 75,000-kva. generators is planned for June, 1952. Located on the South Fork of the Flathead River about 12 mi. east of Columbia Falls, Mont., the dam will store water for power generation, flood control, and future irrigation needs. It will also provide partial regulation of the Columbia River and increase firm power production in hydroelectric plants down stream. Funds appropriated this year total \$22,521,472. Clyde H. Spencer is Construction Engineer.

Deschutes Project, Oregon

Rehabilitation work on **Ochoco Dam** near Prineville, Ore., was begun last June. This structure located on the Crooked River is a hydraulic fill earth dam, 125 ft. high and 965 ft. long at the crest. The upstream face is to be regraded and protected with riprap, the crest widened, the down-stream face

weighted by rock fill, the right abutment stripped and replaced with other material to reduce leakage, the outlet works repaired, and the spillway rebuilt as needed. Current plans call for completion of the rehabilitation work by late fall of 1950. Funds totaling \$1,411,160 were appropriated for this and other minor items of work on the Deschutes Project. J. W. Taylor is Construction Engineer.

Yakima Project, Washington

Construction of 17 pumping plants for the **Roza Division** on the project is virtually completed. Operation of some of the pumping plants is expected to begin during the next irrigation season. Invitations are expected to be issued this spring for alterations of the **Keechelus Dam** spillway. Harold W. Pease is Construction Engineer for the Roza Division, and O. W. Lindgren is Superintendent of the project. Congress allotted \$1,021,184 to the Roza Division this year.

Region 2

Central Valley Project, California

During the year, construction activity continued on this project toward the completion of irrigation systems. One of the highlights of the year was the first delivery of water through 74 mi. of the **Friant-Kern Canal** to lands in the San Joaquin Valley. Irrigation of the agricultural lands in the San Joaquin Valley is one objective of the Bureau's program for conservation and multi-purpose use of the river basin waters in the Central Valley. Other objectives, as authorized by Congress in 1935, are repelling tidal salinity encroachment upon the Delta Region, improvement of navigation facilities, production of electric power, and flood control. Funds made available to the Central Valley this year total \$64,500,627.

Approximately 82 mi. of the **Friant-Kern Canal** (initial capacity 5,000 cfs.) remains to be completed. Current construction includes 59 mi. of the canal. Award of a contract for construction of 26 mi. of concrete pipe line for irrigation distribution systems in the southern San Joaquin Valley was made in December. A call for bids for construction of an additional 69 mi. of concrete pipe line for the Lindmore distribution system is expected to be issued early this year. Invitations are to be issued this spring for construction of an additional 81 mi. of concrete pipe line for distribution systems in the San Joaquin Valley. R. K. Durant is Construction Engineer.

About 36 mi. of the **Delta-Mendota Canal** are completed. Three additional reaches of the canal, totaling 51 mi., are now under construction. Construction of another 18-mi. long section of the canal is to be placed under contract in the near future and specifications for the 8-mi. **Newman Wasteway** are to be issued soon. Current schedules indicate that the Tracy Pumping Plant structure will be completed by early spring. A contract for construction of the **Tracy Pumping Plant Switchyard** was awarded in October. The final location of the Delta Cross Channel has been deter-

mined, and an initial 1-mi. section of the 35-mi. artery is planned to be placed under construction early this year. Oscar G. Boden is Construction Engineer.

The installation of the fifth and last main 75,000-kw. generator was completed at **Shasta Dam** in April. Bids are to be invited soon for construction of a permanent bridge below the dam and widening of the spillway channel below the power plant. The completion of **Keswick Dam and Power Plant**, now at the halfway mark, is scheduled for October, 1950. W. V. McCrystle is Construction Engineer.

The 230-kv. **Shasta-Tracy East Side transmission line** from Shasta to Oroville is virtually completed. The contract for completion of this line from Oroville to Tracy was awarded in November. Invitations were recently issued for construction of the 56-mi., 230-kv. **Cottonwood-Artois section of the West Side transmission line**. Construction on a 17-mi. section from Tracy, Calif., to the Contra Costa substation is expected to begin by spring. H. W. Thomson is Construction Engineer.

Klamath Project, California-Oregon

Enlargement of **Pumping Plant "D"** was completed in October. Construction of earthwork and structures for channel improvement of Lost River and Miller Creek is about 50% completed, and work on the **Lost River Diversion Channel** is about 60% completed. Invitations are expected to be issued this spring for improvement of 8 mi. of the Lower Lost River Channel, and bids are to be asked in May for improvement of 6 mi. of the Upper Langell Valley section of the Lost River Channel. Money available for 1950 totals \$1,559,932. E. L. Stephens is Project Manager.

Santa Barbara Project, California

It is anticipated that a call for bids for construction of **Cachuma Dam** will be issued next summer. This earthfill structure on the Santa Ynez River is to be about 220 ft. above river bed and 2,900 ft. long at the crest. Water is to be diverted through the 6-mi. Tecolote Tunnel, and from the tunnel outlet the water is to be carried through the 28-mi. long **Goleta-South Coast Conduit**. The City of Santa Barbara is to take its additional water from this conduit. Five regulating reservoirs are to be constructed along the course of the conduit. Bids have been asked for construction of the 7-ft. diameter **Tecolote Tunnel**, and invitations are to be issued in February for construction of the 10-mi. Goleta section of the **South Coast Conduit** from the end of Tecolote Tunnel to Santa Barbara. This section of the conduit is to be a 48-in. diameter, reinforced concrete pipe. It is planned to complete construction on all major project features, and begin the initial delivery of water by 1954. The sum of \$4,125,039 is available for 1950. E. R. Crocker is Project Manager.

Region 3

Davis Dam Project, Arizona-Nevada

The 3,670,000-cu. yd. earth and rockfill

embankment of **Davis Dam** was completed in record time last May. Current schedules indicate that appurtenant structures of the dam will be completed by July. Bids are to be asked in June for construction of the concrete spillway stilling basin.

Davis Dam powerhouse structure is to be completed early in 1950, and the first of the five 45,000-kw. hydroelectric generating units is to be installed and placed in operation by the fall of 1950. Through interconnection with the Hoover and Parker Power Plants, Davis Dam power will supply pumping plants on the Gila project in southwestern Arizona and power markets in central and southern Arizona, southern Nevada, and southern California. The Davis-Prescott-Mesa-Coolidge 230-kv. transmission line is to be substantially completed this year, and the Davis-Hoover and Davis-Parker 230-kv. lines and the Parker-Gila 161-kv. line are scheduled for completion in October. The 115-kv. Tucson-Cochise transmission line was awarded last August. Invitations for the construction of about 21 mi. of the 34.5-kv. Wellton-Mohawk power supply transmission line and stringing conductor for the 230-kv., 280-mi. Davis Dam-Mesa line are expected to be issued in March. Funds appropriated by Congress total \$37,455,945 this year. H. F. Bahneier is Construction Engineer for Davis Dam. Construction of the transmission lines is under the supervision of S. A. McWilliams, Project Engineer for Parker Dam Power Project.

Gila Project, Arizona

Specifications for construction of about 9 mi. of the **Wellton-Mohawk Canal** were recently issued, and a contract for construction of the Wellton-Mohawk pumping plants No. 1, 2, and 3 was awarded in December. Invitations are expected to be issued in February for construction of another 30 mi. of the Mohawk Canal and about 13 mi. of protective and diversion dikes. Murray J. Miller is Acting District Manager.

Boulder Canyon Project, Arizona-Nevada

Generators for Units A-3 and A-4 for the Hoover power plant are currently under contract. These 82,500-kva. generating units scheduled to be placed in operation by the summer of 1951, will complete the installation in the Arizona wing of the power plant. The contract for manufacture and installation of the 2,500-kva. generator A-9 was awarded in August. Invitations are expected to be issued in June for installation of turbines, transformers, and accessory equipment for generators A-3, A-4, and A-9. C. P. Christensen is Director of Power.

All-American Canal System, California

Construction of 7 mi. of concrete pipe laterals for Unit 2 of the Coachella Division Valley Distribution System was completed in August. Unit No. 5, 51 mi. in length, was recently completed, and Units 2, 3, and 4, totaling 128 mi. in length, are currently under construction. About half of the construction of earth-



PLATORO DAM, first feature of the San Luis Valley Project in Colorado, is now being constructed. The earthfill structure on Conejos Creek will be 1,500 ft. long at the crest.

work and pipelines for 81 mi. of Unit No. 6 is completed. Construction of Unit No. 7, 71 mi. in length, was begun in October. C. S. Hale is Construction Engineer, and he has an appropriation of \$5,961,251 to carry on the work.

Region 4

Provo River Project, Utah

Construction of the **Murdock Diversion Dam** and work on the completion of the **Duchesne Diversion Dam**, and **Duchesne Tunnel** were begun in October. The Jordan Narrows pumping plant and appurtenances were completed in April. Construction on two sections of the **Salt Lake Aqueduct** totaling 8 mi. in length is nearing completion, and a third 5-mi. section is about 70% completed. Construction on Tunnels 1, 2, and 3 of the Aqueduct is scheduled for completion in the near future. Some \$5,238,624 has been assigned the project for 1950. L. R. Dunkley is Project Engineer.

Paonia Project, Colorado

Work on the enlargement of a 2½-mi. long reach of the **Fire Mountain Canal** is continuing. Invitations for about 6½ mi. of additional enlargement are expected to be issued in March, and an additional 13½ mi. of the canal enlargement is scheduled for issuance in June. Budget allotment is \$628,383. Robert W. Jennings is Construction Engineer.

Eden Project, Wyoming

A call for bids for construction of the **Big Sandy Dam**, on Big Sandy Creek near Eden, is expected to be made in March. The dam is to be an earthfill structure 70 ft. high and 2,300 ft. long. Some \$200,436 has been granted for work this year.

Region 5

San Luis Valley Project, Colorado

Platoro Dam, the first feature of the project, was placed under construction

in June. The dam, located near the headwaters of Conejos Creek, 40 mi. southwest of Alamosa, Colo., is an earthfill structure 150 ft. above stream bed and 1,500 ft. long at the crest. L. F. Wylie is Construction Engineer, with \$1,864,000 available for 1950.

Rio Grande Project, New Mexico-Texas

The 115-kv., 71-mi. **Elephant Butte-Socorro** transmission line was completed in Jan., 1949. Construction on the Socorro Substation was completed in August, and work on the **Alamogordo Substation** is virtually completed. For remaining work, \$372,450 has been appropriated. Labon Backer is Acting Construction Engineer.

Tucumcari Project, New Mexico

Construction of 9 mi. of the **Conchas Canal** and 38 mi. of laterals of Unit 6 was completed in August. To complete **Hudson Canal** and other incidentals this year, \$1,021,481 has been made available. Walter Bierce is Construction Engineer.

Fort Sumner Project, New Mexico

Specifications for construction of the **Fort Sumner Diversion Dam** are expected to be issued in the near future. The dam is to be a concrete-gravity structure about 700 ft. long and 40 ft. high. The dam is to be constructed on the Pecos River near Fort Sumner, and \$750,000 has been appropriated. Walter Bierce is Construction Engineer.

Regions 6 and 7

Missouri River Basin Project

During 1949 four dams were completed and an additional five dams were started on the Missouri River Basin Project. Construction is continuing on three dams and four others are scheduled to begin this year on the project which is to bring flood control, irrigation, and other benefits to many sectors of this huge basin area. For the Bureau's work in the Missouri Basin, Congress has appropriated a total of \$95,950,854.

Intensified activities at **Kortes Dam** have advanced construction to about 80% of completion. Kortes Dam, a concrete-gravity structure across the North Platte River, about 33 mi. northeast of Rawlins, Wyo., is approximately 440 ft. long at the crest and about 200 ft. in height above the bed of the river. The power plant is a reinforced concrete structure and is to accommodate three main 12,000-kw. generating units. Current plans call for the generation of initial power by July, 1950. Charles S. Rippon is Construction Engineer.

Construction of **Boysen Dam** and power plant is about 65% completed. The dam is located on the Big Horn River about 20 mi. south of Thermopolis, Wyo. An earthfill structure, Boysen Dam is about 150 ft. in height above the bed of the river and is about 1,100 ft. long at the crest. The power plant is a reinforced concrete structure and will house two main 7,500-kva. generating units. Relocation of the C.B.&Q. Railroad is nearing completion. G. R. Rolin is Project Engineer.

Construction of **Angostura Dam**, located on the Cheyenne River about 7 mi. southeast of Hot Springs, S. Dak., is virtually completed, and storage has begun in the reservoir. The dam consists of a 960-ft. long concrete-gravity type structure extending from the left abutment across the river channel and an earth embankment about 1,000 ft. long extending along the right abutment. The total crest length is about 2,000 ft. and the maximum height above foundation is about 180 ft. Norval Enger is Acting Project Engineer.

Construction is practically complete also on **Enders Dam** on Frenchman Creek, Neb. This earthfill structure is about 2,570 ft. long at the crest and has

a maximum height of about 100 ft. U. V. Engstrom is Construction Engineer.

Recently completed is **Medicine Creek Dam** located 6 mi. northwest of Cambridge, Neb. This earthfill structure, about 102 ft. above the bed of the creek and 4,000 ft. long at the crest, was completed more than a year ahead of schedule. William J. Quinn is Acting Construction Engineer.

Construction of **Heart Butte Dam** was completed in December. The dam is an earthfill structure about 1,850 ft. long at the crest, with a maximum height of about 125 ft. above the river channel. It is located on the Heart River about 18 mi. south of Glen Ullin, N. Dak. W. W. Brenner is Construction Engineer.

Bonny Dam, an earthfill structure on the South Fork of the Republican River, near Hale, Colo., was started in December, 1948, and is about 45% completed. The dam is to be about 9,300 ft. long at the crest and 130 ft. in height above the stream bed. C. L. Mutch is Construction Engineer.

Construction on **Dickinson Dam** on the Heart River near Dickinson, N. Dak., began last April. The dam is to be an earthfill structure 69 ft. above the lowest point of the foundation and 2,275 ft. long at the crest. W. W. Brenner is Construction Engineer.

Superior-Courtland Diversion Dam on the Republican River, 2 mi. west of Guide Rock, Neb., was placed under construction in March. The dam is to be a 300-ft. long concrete gravity overflow structure. Paul E. Strouse is Construction Engineer.

Cedar Bluff Dam, located on the Smoky Hill River about 14 mi. south of Ogallah, Kans., was placed under construction in April. It is an earthfill structure about 134 ft. in height above stream bed and about 12,500 ft. long at the crest. R. J. Walter, Jr. is Construction Engineer.

Construction of **Shadehill Dam**, on the Grand River, 20 mi. south of Lemmon, S. Dak., was begun in April also. An earthfill structure, the dam is to be about

145 ft. in height above the lowest foundation and about 12,900 ft. long at the crest. D. M. Forester is Construction Engineer.

Canyon Ferry Dam and power plant were placed under construction in May of this year. Located on the Missouri River about 17 mi. east of Helena, Mont., the dam is to be a concrete gravity structure about 220 ft. in height above the foundation and about 1,000 ft. long at the crest. The power plant is to be of reinforced concrete construction. W. P. Price, Jr. is Construction Engineer.

It is anticipated that the construction of **Trenton Dam**, which is to be an earthfill structure 100 ft. high and about 8,000 ft. long at the crest, will begin early in the fall of 1950. The dam is located on the Republican River about 2 mi. west of Trenton, Neb. The foundation for the dam was begun in August. Ellis L. Armstrong is Construction Engineer.

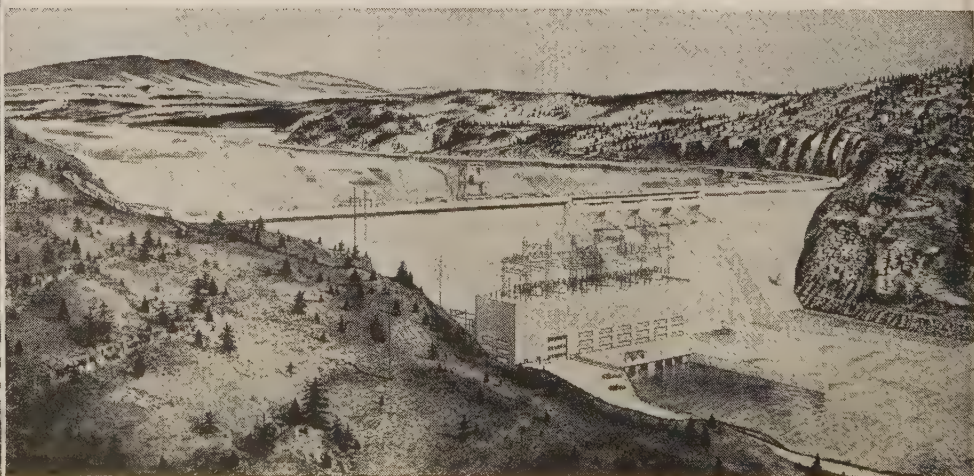
Anchor Dam on Owl Creek, a tributary of the Big Horn River, approximately 40 mi. west of Thermopolis, Wyo., is expected to be placed under construction by early summer. This dam is to be a concrete arch structure about 200 ft. in height above the lowest point of the foundation and about 550 ft. long at the crest.

Construction of **Tiber Dam** on the Marias River, about 13 mi. south of Chester, Mont., is scheduled to be started by late spring. This dam is to be an earthfill structure about 200 ft. high above stream bed and about 4,250 ft. long at the crest.

The contract for construction of **Keyhole Dam** on the Belle Fourche River, about 13 mi. northeast of Moorcroft, Wyo., is expected to be awarded by early spring. An earthfill structure, the dam is to be 115 ft. high above the stream bed and about 3,400 ft. long at the crest. F. W. Goehring is Construction Engineer.

Present plans call for the construction of the **Missouri Diversion Dam** located 6 mi. downstream from Fort Peck Dam in Montana, to begin by spring. This dam is to be 650 ft. long and 30 ft. high,

CONSTRUCTION of the \$36,000,000 Canyon Ferry Dam on the Missouri River near Helena, Mont., started formally with a powder blast last July. Work will continue until 1953 on the big concrete gravity structure, which will rise 220 ft. above streambed and be 1,000 ft. long at the crest. Canyon Constructors, Inc., have an \$11,896,425 contract for initial work.



and is to consist of a concrete structure mounting fourteen 42 x 18-ft. radial gates, a concrete headworks structure for three 25 x 16-ft. radial gates, and 2,600 ft. of earth dike.

Invitations are expected to be issued this spring for construction of the **Republic Diversion Dam** on the Republican River near Hardy, Kan. The dam is to be a reinforced concrete structure about 25 ft. in height above foundation and about 500 ft. long at the crest. Specifications for construction of the **Red Willow Diversion Dam** on the Republican River near Indianola, Neb., are expected to be issued in June. This structure is to be of reinforced concrete construction about 10 ft. high above the river bed and 700 ft. long at the crest.

Work on the initial sections of the Superior and Courtland Canals was begun this year. A call for bids has recently been issued for construction of an 8-mi. reach of the **Superior Canal**, and invitations are to be issued soon for construction of an additional 9 mi. It is anticipated that specifications for construction of 12 mi. of the **Courtland Canal** will be issued by early summer. Construction of a 30-mi. section of the **Cambridge Canal** is expected to start by summer. Paul E. Strouse is Construction Engineer for the Superior-Courtland Unit, and C. M. Jackson is Construction Engineer for the Cambridge Unit.

Invitations are to be issued in March for construction of 21 pumping plants on the Heart River, the N-Bar-N pumping plants, and the Fort Clark River pumping plants, all in North Dakota.

Transmission lines for the project include the Gering-Sidney 115-kv. line, work on which is nearing completion; the Sterling-Sidney 115-kv. line, construction of which was recently completed; the Fort Randall-O'Neill 115-kv. line which was placed under construction in August; and the Casper-Gering 115-kv. line, which is about 80% completed.

Calls for bids are expected to be issued in January for construction of the 38-mi. long Jamestown-Edgeley 115-kv. line and the 70-mi. Edgeley-Forman 69-kv. line.

Invitations for bids are to be issued early this year for construction of the following transmission lines: Seminole-Sinclair, 115-kv., 34 mi.; Carrington-Jamestown, 115-kv., 52 mi.; Devils Lake-Carrington, 115-kv., 50 mi.; Bismarck-Devaul, 69-kv., 41 mi.; Rugby-Devils Lake, 115-kv., 61 mi.; Voltaire-Rugby line, 115-kv., 56 mi.; Sterling-Ogallala, 115-kv., 88 mi.; Boysen-Alcova, 115-kv., 100 mi.; and Alliance-Chadron, 115-kv., 55 mi.

Bids for construction of the following transmission lines are expected to be invited this spring. Voltaire-Garrison, 115-kv., 55 mi.; Garrison-Bismarck, 230-kv., 65 mi.; and Bismarck-Jamestown, 230-kv., 105 mi. long. In May, specifications are expected to be issued for construction of: Jamestown-Valley City, 115-kv., 37-mi. long transmission line and the Devils Lake-Lakota, 115-kv., 27-mi. long line.



LESLIE N. McCLELLAN succeeded Walker Young during 1949 as Chief Engineer of the Bureau of Reclamation. McClellan was formerly chief electrical engineer and assistant chief engineer for the Bureau at Denver.

Colorado-Big Thompson Project, Colorado

The beginning of water storage in the 550,000 ac. ft. **Granby Reservoir**, the principal reservoir on this project, marks an important milestone in the development of this far-flung transmountain diversion project, which is to furnish supplemental water to lands in northeastern Colorado from the western slope of the Rocky Mountains.

Construction of **Granby Dam** and dikes is virtually completed. The dam is an earthfill structure on the Colorado River about 232 ft. in height above river bed and 185 ft. long at the crest.

Construction on the **Granby Pumping Plant** is nearing completion also. This structure is a heavily reinforced concrete building 187.5 ft. high and houses three pumps which are to be driven by 6,000 hp. motors. Invitations have recently been issued for the installation of the three motors. The function of the pumping plant is to lift 200 cfs. of water a maximum of 186 ft. from the Granby Reservoir to the Granby Pump Canal.

Work on the 2.1-mi. long **Granby Pump Canal** was completed in November. Construction of the **Willow Creek Diversion Dam**, an earthfill structure, 137 ft. high, and the 4-mi. long **Willow Creek Canal** is expected to begin by summer.

Construction of the **Marys Lake Power Plant** and the **Estes Park Power Plant** is about 80% completed. **Olympus Dam**, an earthfill structure about 56 ft. high and 1,800 ft. long, was completed in September.

Construction of the **Olympus and Pole Hill Tunnels**, features of the Estes Park Foothills Power System, was begun in September. A call for bids for construction of the one-half mile long **Olympus Siphon** was issued in December. Im-

portant structures of the system expected to be placed under construction in 1950 include: the 3,600-kva. **Pole Hill Power Plant**, invitations for which are expected to be issued in June; the three dams and dike at Carter Lake, which are to be started in the summer; and the **Carter Lake Pressure Tunnel**, scheduled to be started by late summer.

Terminal conveyance features of the Colorado-Big Thompson Project now under construction include the 10-mi. long **Horsetooth Feeder Canal**, started in May, and the one-mile long **Horsetooth supply Conduit**, begun in September. Other terminal features scheduled for construction this year are: the 3-mi. long **North Poudre Supply Canal Tunnels**, expected to begin in June; the 8-mi. long section of the **North Poudre Supply Canal**, invitations for which are expected to be issued this spring; and the 11-mi. **St. Vrain Supply Canal**, to be placed under construction by midsummer.

Currently under construction are the following transmission lines: Flatiron-Greeley, 115-kv., about 60% completed; Brush-Yuma, about 50% completed; Wiggins-Hoyt, virtually completed; the 69-kv. transmission circuit through the Alva B. Adams Tunnel, about 10% completed; and the Yuma-Wray 69-kv. line begun in November. A contract for construction of the Flatiron-Longmont-Leyner and Brighton transmission line was awarded in October.

Invitations are to be issued this year for the following transmission lines: Kremmling-Oak Creek, 115-kv., 42 mi. long, in February; Salida-Gunnison, 115-kv., 65 mi. long, in April; and Brighton-Brush, 115-kv., 72 mi. long, in May.

George R. Highley is Construction Engineer for the Granby Area. G. A. Samson is Acting Construction Engineer for the Horsetooth Reservoir, the Carter Lake structures, and the terminal features of the project. F. K. Matejka is Construction Engineer for the Estes Park Area, and C. E. Klingensmith is Construction Engineer for the Foothills South Area which includes the North Poudre Supply Canal tunnels and transmission lines for the project. Total funds available to the Colorado-Big Thompson Project in 1950 amount to \$24,859,750.

Riverton Project, Wyoming

The current contract for construction of the **Wyoming Canal** tunnel and structures, and the **Muddy Ridge Canal** is virtually completed. Current schedules indicate an additional 14 mi. of the Wyoming Canal, and 27 mi. of the Muddy Ridge Canal will be placed under construction during the summer. Appropriation is \$2,526,116 for 1950 construction. T. A. Clark is Construction Engineer.

Organization

Commissioner of the Bureau of Reclamation is Michael W. Straus, Washington, D. C. Design and construction activities of the Bureau are under the direction of L. N. McClellan, Chief Engineer, Denver, Colo.

Municipal Programs for 1950

Seattle

APPROXIMATELY \$10½ million will be spent by the City of Seattle in construction next year, exclusive of Park and Light Department betterments, according to a report from R. W. Finke, City Engineer. The segregation by types of projects is as follows:

Paving	\$2,000,000
Sewers	1,100,000
Grading	200,000
Water supply and distribution.....	1,000,000
Concrete sidewalks	200,000
Alley paving	600,000
Bridges, viaducts and miscellaneous	5,500,000

Some of the principal projects included in the above are: the double-deck 6-lane Alaska Way viaduct along the waterfront, by-passing the business district, estimated to cost \$8,500,000, of which about half will be expended in 1950; street lighting on the city arterials estimated to cost about \$1,000,000; the Diagonal Ave. trunk sewer which will cost about \$800,000, and the Campus Parkway underpass, cost \$190,000.

E. R. Hoffman, Superintendent of the Department of Lighting, indicates that another \$19,000,000 will be spent by his department for construction in 1950. Of this amount, \$7,800,000 will be expended on continuation of the Skagit River hydroelectric development; \$6,850,000 will be for additions to the transmission system; \$3,900,000 for distribution facilities; and approximately \$450,000 for warehouse and other additions.

The Skagit River work includes installation of the fourth generator at the Gorge Power Plant and installation of three turbines and 90,000-kw. generators at the Ross Power Plant. During the year about 45% of the 23-kv. transmission line from Ross Power Plant to Bothell will be constructed and 40 mi. of 115-kv. transmission line from Bothell to various substations will be erected.

The major portion of the amount scheduled for distribution system improvements will go for the addition of approximately 140,000 kva. of substation capacity. All of these improvements are a part of the comprehensive plan of system extension recently adopted by the City, to be completed over a period of approximately five years. The completion of this program will give the City an installed hydro capacity of 534,000 kw.

Denver

THE CITY and County of Denver has a heavy construction program projected for 1950. In a report from Terry J. Owens, City Engineer, the following items are tabulated:

PCC paving, 17th St.....	\$188,000
Lincoln St. widening	241,700
Wellshire sanitary sewer.....	100,000
Street Improvement District 160..	250,000
Street Improvement District 167..	250,000
Street Improvement District 168..	200,000

The phenomenal growth of population in the West is sustaining the demand for municipal facilities — Western cities will initiate many large projects this year and will continue heavy programs already under way

Re-decking 20th St. Viaduct.....	200,000
Clarkson St. Bridge.....	75,000
Rebuild Monaco Blvd.....	130,000
Alameda Ave., Colorado to Monaco	150,000
Airport Taxiways	200,000
Sanitary Sewer District No. 6.....	200,000
Sanitary Sewer District No. 7.....	300,000
Wier Gulch storm sewer.....	200,000
N. E. Denver storm sewer.....	100,000
Brighton Blvd. paving.....	125,000
Reconstruct Sheridan Blvd.....	450,000
Smaller paving jobs.....	659,200
	\$4,018,900

An additional extensive construction program for Denver is to be undertaken by the Board of Water Commissioners under the direction of D. D. Gross, Chief Engineer. The Board's projects are:

Completion of 9-in. conduit, Platte Canyon to Marston Lake.....	\$1,674,000
Continuing Montezuma tunnel....	112,000
Completion of 90-in. conduit tunnel	100,000
60-in pipeline, Moffat Filter Plant to city.....	1,188,000
54-in. pipeline, Ralston reservoir to Moffat Filter Plant.....	1,616,000
Coagulation basin, Moffat Filter Plant	338,000
Clear Water Reservoir.....	211,000
Service main extensions	1,055,000
Start of Reservoir No. 22.....	1,491,000
St. Louis diversion tunnel.....	169,000
Warehouse	101,000
Small improvements, total.....	516,000
	\$8,571,000

Los Angeles

STATEMENTS from Lloyd Aldrich, City Engineer of Los Angeles, and Samuel B. Morris, General Manager and Chief Engineer of that city's Department of Water and Power, indicate that Los Angeles will carry out the largest municipal program in the West in 1950.

According to Aldrich, "Current trends indicate that the value of City projects to be constructed during 1950 may be roughly estimated at about \$20,000,000, not including the Hyperion Activated Sludge Plant. The projects include the types of public improvements normally designed by the Bureau of Engineering, such as streets, sewers, storm drains, and bridges.

"The largest City project now under construction is the Hyperion Activated Sludge Plant, the total cost of which is estimated at \$41,000,000. Contracts have been awarded for all but two of the various units of this plant. These two units are: (1) Elutriation and Sludge

Concentration, estimated at \$795,000, and (2) Plant Ground Improvement, estimated at \$359,522. Contracts for both of these units will be awarded during 1950. Construction work on this plant will amount to, roughly, \$10,000,000 during the next calendar year. This figure represents the uncompleted portion of those units now under contract."

Morris states that "the Los Angeles Department of Water and Power contemplates expenditures for major construction activities during 1950 in excess of \$57,593,000, of which \$39,750,000 will be in connection with Power System developments and \$17,843,000 will be in connection with Water System construction.

"Major projects under construction in the Water System include completion of the Baldwin Hills Reservoir, with 89,000 ft. of 54- to 66-in. pipe. This project is approximately 50% complete, with a remaining expenditure of \$4,339,000. An outlet line from Silver Lake Reservoir to the southern part of Los Angeles, will be 35,000 ft. in length, with a cost of \$2,600,000, a major portion of which will be expended in 1950. A major link in the City supply will include a new reservoir in the Eagle Rock area with 37,800 ft. of 66- to 84-in. siphon, 13,400 ft. of 7-ft. pressure tunnel, and a 300,000 cu. yd. dam with associated outlet works. Total estimated cost of this project is \$8,900,000, of which \$2,100,000 is estimated for expenditure during 1950. The enlargement of Westgate trunk line, 14,000 ft. long, to 36-in. diameter is estimated at \$600,000. Additions to distribution mains and services amount to \$5,800,000 during the year; and additions to Encino and Franklin Reservoirs, will largely be completed during 1950 at a cost of \$689,000. An additional shaft to Elizabeth Lake Tunnel and miscellaneous small buildings and general additions and betterments to the Department's Water System will amount to \$1,715,000 during the coming year.

"For the Power System, two major additions to generating facilities are now in progress. The Owens Gorge Project, which will develop 112,500 kw., is contemplated for completion in May, 1951, with a project cost of \$42,000,000. Approximately \$20,000,000 of this amount will be expended during 1950. Additional fuel storage facilities for the Harbor Steam Plant will be completed during 1950, which with other steam plant additions will account for \$1,700,000 to be expended during the year.

Other major items include additional transmission facilities, \$2,000,000; expansion to receiving stations, \$2,500,000; expansion to distributing stations, \$4,500,000; expansion of the distributing system within the City, \$7,750,000; and miscellaneous structures, \$1,300,000."

Boise

BONDS HAVE been voted by the citizens of Boise, Idaho, for a 300-ft. bridge across the Boise River at 16th St., \$180,000; a fire station at 16th and Front Sts., \$90,000, and a city shop building, \$60,000. Construction of the municipal sewage disposal plant, costing altogether \$1,500,000, will be completed early in the year.

In addition, an election will be held early in the year on the authorization of \$1,500,000 in bonds to finance a municipal auditorium, according to J. V. Otter, Commissioner.

Las Vegas

PROPOSED in a report from Greeley and Hansen, consulting engineers of Chicago, a new water supply for the city of Las Vegas, Nev., will soon be under construction. The report urges construction during 1950 of a 42-in. pipeline from Las Vegas to a point near Pittman, where it would connect with a 20-in. line from a reservoir near Henderson. The cost of this pipeline and necessary storage in Las Vegas, plus the cost of acquiring the water producing and distributing system of the Las Vegas Land & Water Co., would amount to about \$4,500,000. It is estimated that the new facility would make available an additional 8 mgd. for the Las Vegas area.

It is explained in the report that this expansion would probably take care of the city's needs for only about 10 years, after which a new 40-in. line could be built from Lake Mead to the presently proposed junction near Pittman, so that in the end, Las Vegas would have an independent supply from Lake Mead.

Portland

ANTICIPATED construction in the City of Portland during 1950 is reported by Ben S. Morrow, City Engineer, as follows:

Work is progressing on the \$15,000,000 sewage disposal and intercepting sewer project, now about 50% under contract, or finished. Half of the remainder is expected to be under contract before the end of 1950.

Storm and sanitary sewer systems requiring about 18 mi. of 8- to 24-in. pipe, and designed to serve approximately 700 ac. of residential property recently annexed to the city, are being planned at an estimated cost of \$450,000.

A contract for a trunk sewer in S.E. 82nd Ave. and S.E. Cora St. was recently awarded at \$193,649. More than 16,000 lin. ft. of 6- to 42-in. pipe and 34,000 cu. yd. of excavation are included in the contract. Smaller sewer contracts approximating \$250,000 will probably be under way before the end of the year.



THE INGENUOUS design of small sewage disposal plants is exemplified by this plant at Santa Fe, N. Mex. Two "Caterpillar" gas-operated electric sets provide the plant's power.

Street improvements will probably total close to \$200,000, divided as follows: 2 mi. of pavement, \$80,000; 5 mi. grading and graveling, \$90,000; and 2 mi. sidewalks, \$30,000.

The Bureau of Water Works contemplates laying 4 mi. of 36-in. steel main to cost \$400,000.

Salt Lake City

W. D. BEERS, City Engineer of Salt Lake City, anticipates a construction program in 1950 at least as large as 1949. The principal items to be handled by his office include: sidewalks, \$100,000; curbs and gutters, \$200,000; asphaltic pavement, \$100,000; and waterworks, \$75,000.

In addition, the Bureau of Reclamation will complete the Salt Lake aqueduct from Deer Creek reservoir during 1950, entailing an expenditure of about \$4,000,000.

San Diego

CONSTRUCTION work in San Diego, Calif., during the fiscal year 1950 will amount to \$12,590,500, according to A. K. Fogg, City Engineer. Of this, \$4,965,000 is included in the budget for general street, highway and sewer works, including 3.2 mi. of Wabash Ave., of Federal Blvd. to 40th St. constructed as a freeway, to cost \$1,182,000; 3.6 mi. of Mission Valley Road constructed as a freeway and costing \$515,000; local street, sewer and water installations totaling \$1,750,000; local subdivision improvements totaling \$700,000; 3.75 mi. of the Alvarado Canyon trunk sewer to cost \$191,000, and other smaller improvements totaling \$627,000.

Work to be undertaken or completed by the Water Department in 1950 includes completion of the Alvarado 66 mgd. filtration and softening plant, at a

cost of \$3,300,000; the Kearney-Mesa pipeline to serve northern San Diego, \$1,150,000; the Bay View 10 mg. regulating reservoir, \$375,000; Highland Ave. pipeline, \$250,000; Bonita pipeline replacement, \$300,000, and additional water developments including distribution works, \$850,000.

As a part of the Mission Bay development, the Midway Drive bridge over the San Diego River will cost \$1,027,500; and roadways, landscaping and recreational development around the area will cost \$376,000.

Also during the year, plans will be in preparation on additional improvements to the water system costing approximately \$3,750,000, for Sutherland reservoir and conduit at estimated cost of \$3,700,000; Highway 101, bridge over the San Diego River estimated to cost \$350,000; the extension of Sunset Cliffs Blvd., estimated at \$1,025,000, and street improvements estimated at \$150,000.

Tacoma

ACCORDING to D. E. Morris, City Engineer of Tacoma, that city will engage in an important construction program during 1950. The largest single item will be a sewage treatment plant to cost approximately \$750,000. In addition, an interceptor sewer to cost \$100,000 and a submerged outfall will be initiated during the year. Local sewer districts will contract work aggregating \$319,000.

Street work to be carried out under Morris' direction will include the improvement of Park Ave. from 48th to 96th Sts., which will cost about \$300,000. It is also anticipated that paving will be installed on Washington St. from 40th to 58th Sts., at a cost of about \$176,000, and other smaller improvements are expected. The Tacoma Department of Public Utilities, Light Division, according to J. Frank Ward, Superintendent,



MANY Western cities will place special emphasis on street construction during 1950. Illustrated is a typical street grading operation—this one at Port Angeles, Wash.

will spend \$3,568,000 for construction, divided as follows:

Distribution system	\$1,154,400
Receiving stations	1,772,300
Transmission lines	280,500
Underground secondary network system	77,100
Hydro generation replacements and improvements to existing units	163,700
Steam plant improvements	5,000
Communication system	22,500
Miscellaneous	92,500

The Cowlitz River hydroelectric generation program, which had been anticipated by the Light Division for this year, has been held up by unfavorable action of the State Legislature and it is not known when work will proceed on this undertaking.

San Jose

THE PUBLIC works program of the City of San Jose, Calif., reported to *Western Construction News* by H. J. Flannery, City Engineer, will total \$1,770,000, divided as follows:

Storm sewers	\$650,000
Sanitary sewers	150,000
Airport development	150,000
Street lighting	120,000
Highway and street projects	700,000

Tucson

PLANS FOR construction in Tucson, Ariz., during 1950 call for installation of about \$600,000 worth of asphaltic paving; \$200,000 worth of sanitary sewage collectors, construction of a new sewage disposal plant of the activated sludge type, 20-mgd. capacity, to cost about \$1,000,000; development of 5 new wells at a cost of about \$93,000 by the City Water Department, and installation of approximately \$1,250,000 worth of new water mains; construction of the first

section of the Tucson Freeway in co-operation with the State Highway Department, consisting of a 48-ft. roadway about 5 mi. long; and acquisition of right of way for flood control projects to be undertaken by the Corps of Engineers. Glenton C. Sykes is City Engineer of Tucson.

Metropolitan Water District

ACCORDING to Julian Hinds, General Manager and Chief Engineer, construction at this stage of development of the Colorado River Aqueduct is dependent both upon development of present constituent areas and upon annexation of cities and other areas not now included in The Metropolitan Water District of Southern California.

Demands upon the aqueduct, due to increased use of Colorado River water and requiring additional construction, were met in 1948 and 1949 by construction of a second 100-mgd. unit at the softening and filtration plant, heretofore described in *Western Construction News*; of a 16-in. lateral from the upper feeder 5,416 ft. long to San Marino, one of the original 13 District cities; and of two laterals from the Palos Verdes feeder, one a 6.8-mi., 45-in. pipeline together with necessary connections to supply constituents of the West Basin Municipal Water District, the other 54-in. pipeline 2.8 mi. in length to augment service to Compton and Long Beach. This last mentioned line, which was well along to completion in December, is designed to become part of a cross feeder in the ultimate distribution system of the District. Total cost of the facilities mentioned above is approximately \$6,300,000.

Several annexation areas are under consideration or in process of formation,

but it is not probable that annexation proceedings can be completed in time to call for extensive District construction in 1950. Construction during 1950 is expected to be limited to amplification of control structures to accommodate the increasing water demand, and relatively minor extensions for additional service to present constituent areas, at a total cost probably not exceeding several hundred thousand dollars.

Long Beach

AN EXTENSIVE program of construction is anticipated by the City of Long Beach during 1950, according to Jess D. Gilkerson, City Engineer. The principal improvements are listed herewith:

Paving Projects

Atlantic, San Antonio to 52nd St.	\$210,840
Pacific Ave., 3rd to 10th Sts.	113,200
Carson St., Orange to Cherry	111,607
American Ave., 6th to Anaheim	55,000
Miscellaneous paving	141,771
Local street improvements (17 projects)	131,217
Alley improvements (57 projects)	251,000
Ornamental lights, Alamitos Circle	107,064
Ornamental lights (4 projects)	86,805
	\$1,208,504

Sewers and Storm Drains

Artesia St. storm drain	\$470,000
Two other projects	53,100
	\$523,100

Public Buildings

Health Department Building	\$450,000
Veterans Memorial Stadium	700,000
Fire, Recreation, and others	352,000
	\$1,502,000

Other Construction

Del Amo Blvd. underpass	250,000
High intensity lights, Municipal Airport	55,000
Magnolia Ave. pleasure pier	68,000
Park improvements	167,700
	\$540,700

Reno

ALTHOUGH RENO's construction budget for 1950 has not yet been approved, it is anticipated by City Manager Emory Branch that the program will be somewhat less than that carried out in 1949. The three principal items will be: completion of the City's storm drain system, on which \$85,000 was spent in 1949, and approximately a like amount will be required for this year; provision for an adequate fire alarm system which will cost about \$50,000; and completion of work at the new sewage disposal plant.

Berkeley

THE 1950 CONSTRUCTION program for the City of Berkeley, Calif., as reported by Richard Gallagher, Director of Public Works, will total \$654,000 and will consist mainly of sewage separation projects and street improvement work.

The largest single project anticipated

is the separation of sewer lines on Ashby Ave., estimated to cost \$150,000. Similar work on Shattuck Ave. and Walnut St. is estimated at \$90,000, and on Woolsey St. at \$70,000. The largest anticipated street work is the reconstruction of Sixth St. from Dwight Way to University Ave., at a cost of \$70,000.

Oakland

THE 1950 construction programs of the various city departments of the City of Oakland have been compiled by Charles A. Reed, City Engineer, a total of \$12,219,619.

Street Projects

Fourteenth Ave. to 31st St.....	\$366,000
Broadway, 25th to MacArthur.....	110,000
Bay Place, Harrison to Grand.....	100,000
San Leandro St., Seminary to 54th	135,000
Hollis St. from 32nd to	
Yerba Buena	83,200
Twelfth St. viaduct	40,000
Residential street surfacing.....	350,000
	\$1,184,200

Sanitary and Storm Sewers

Fourteenth Ave. separation	\$221,000
Upper Park Blvd. sewer.....	300,000
Ascot & Chalton sewer.....	300,000
Seminary Creek outlet.....	190,600
Athol & Park Blvd., storm sewer..	158,700
Smaller projects	605,119
	\$1,775,419

Other Projects

Hall of Justice.....	\$2,000,000
Library and fire houses.....	125,000
Playground improvements.....	235,000
Port improvements	800,000
Mountain Blvd. freeway.....	1,100,000
School Department	5,000,000
	\$9,260,000

Lewiston

THE FOLLOWING projects are proposed for construction during 1950 in the City of Lewiston, Idaho, according to William P. Hughes, City Engineer: an administration building and landscaping at the City-County Airport, \$162,000; street improvement under Improvement Districts, \$75,000; and sewage disposal plant (dependent on bond election), \$275,000; an extension to the municipal water plant (also dependent on a bond election), \$250,000, and flexible pavement, \$25,000.

Fresno

A PROGRAM of construction totaling \$1,314,000 is contemplated in Fresno, Calif., during 1950, according to A. Segal, City Engineer. Accounting for approximately half of the total cost is the construction of sanitary sewer trunks, interceptor and laterals, at a total cost of \$600,000.

The Water Department expects to spend \$110,000 for 300 wells and pumping plants and water main extensions. Some \$90,000 will be spent for canal lining and the municipal farm. Airport improvements will total \$79,000 including a high intensity lighting system and two new buildings. A fire house and a mu-

nicipal garage will total approximately \$100,000.

Storm sewers and pumping plants for storm waters will cost about \$65,000. It is anticipated that \$197,000 will be spent in local street resurfacing and widening; street lighting and traffic signals will cost about \$73,000.

San Francisco

BY APRIL, 1950, the San Francisco Department of Public Works will have actively under way contracts aggregating over \$25,000,000 in total value, according to a statement by Ralph G. Wadsworth, City Engineer. Sewage treatment facilities will account for a large part of this, about \$14,000,000 being in sewage treatment plants and appurtenant sewers already under contract, and about \$5,000,000 of additional sewage treatment work will be awarded.

Highway and street construction will receive special emphasis in 1950. The Broadway Tunnel, which with its approaches will extend from Powell to Polk St., should be under construction during March. Important structures to be undertaken are the Stanley Dr. Underpass on Junipero Serra Blvd. and the replacement of the Mission Viaduct at the Alemany Blvd. crossing. These two structures and the Broadway Tunnel will cost about \$6,500,000. Other major street projects will include the widening of San Jose Ave. and Guerrero St. south of Army St., and also the reconstruction of the El Camino del Mar, the scenic boulevard around Lands End.

The streetcar track removal program will continue at full speed, approximately \$2,000,000 being allocated for 1950 work. About 36 mi. of street had been rehabilitated at the end of 1949 by the complete removal of abandoned tracks and the repaving of the street from curb to curb. This work is averaging about \$100,000 per mi. of street. The 1950 program should bring the total

length completed to 56 mi. and leave still to be done approximately 44 mi.

Other projects scheduled for 1950 are a new Public Works yard, additional traffic signals to cost about \$500,000, and various minor street and highway improvement projects aggregating about \$1,000,000.

In addition to this program, the Public Utilities Commission, as reported by A. O. Olson, Manager and Chief Engineer, will carry out an extensive program during the year, including \$5,655,000 for municipal railway improvement, \$6,330,000 for the Hetch Hetchy water supply and power system, \$12,560,000 on the water department, \$5,300,000 on the airport, and \$365,000 on street lighting.

The larger projects in this Public Utilities program include the following:

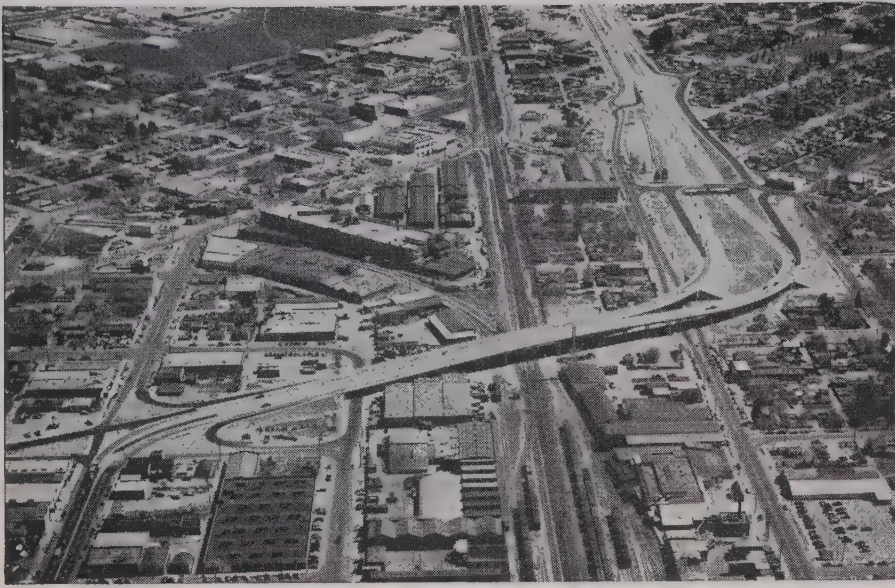
Buildings for railway.....	\$2,300,000
Overhead construction for trolley coaches.....	1,175,000
Final 14.2 mi. of Second San Joaquin Aqueduct	3,800,000
Cherry River project, initial construction	2,000,000
Sutro Reservoir lining.....	1,120,000
Sutro Reservoir pipeline connections	1,000,000
Lake Merced pumping station.....	1,250,000
Bay Division of Hetch Hetchy Aqueduct, 35 mi.....	8,500,000
Airport runways, taxiways, etc.....	3,100,000
Airport terminal	1,000,000

El Paso

PUBLIC WORKS projects in El Paso, Tex., in 1950 will cost about \$1,900,000. The major divisions of the expenditure include paving of miscellaneous streets throughout the city, \$350,000; storm drains in streets, and sewers in the east part of the city, \$350,000; access roads, fire station and other improvements at the airport, \$150,000; improvements to parks and playgrounds, \$50,000; and construction of the continuation of Paisano Dr. to form a belt route, about \$1,000,000. This latter improvement will

WESTERN contractors are adept at meeting problems by developing special equipment such as this 80-ft. long conveyor rig used to backfill previously excavated sewer trench.





LARGER CITIES devote a portion of their budgets to absorbing part of the costs for freeway construction within their limits. Illustrated is a freeway through Fresno, Calif.

be constructed by the Texas Highway Department. These figures are reported by Glenn H. English, Assistant City Engineer.

Colorado Springs

ACCORDING to Carl M. Bennett, City Engineer of Colorado Springs, that city expects to cooperate with the Bureau of Public Roads and State Highway Department on construction of the Colorado Ave. Bridge at a cost estimated at \$600,000. A special improvement district will spend approximately \$250,000 and a forebay tank will be built at the Manitou hydroelectric plant at a cost of \$65,000.

It is expected that the total construction program in Colorado Springs, including utilities department, park department and other municipal functions will exceed \$2,000,000.

Spokane

THE CITY of Spokane will expend over \$1,000,000 in 1950 on an intercepting sewer constructed in connection with the municipal disposal program. The two principal items will be a 72-in. tunnel, 5,700 ft. long, estimated to cost \$536,750, and 11,700 ft. of sewer varying in diameter from 8 to 72 in., estimated to cost \$487,367.

In addition to this work, Charles E. Davis, City Engineer, indicates that the construction program of the city will consist of 10 mi. of street grading, 20 mi. of concrete curb, 10 mi. of sidewalk, 20 mi. of paving and 10 mi. of sewers.

Glendale

IMPROVEMENTS contemplated during 1950 in Glendale, Calif., according to Charles D. Ament, Assistant City Engineer, include the extension of West Glenoaks Blvd., \$142,000; widening of Wilson Ave., \$71,800; placing of 18,000 ft. of 8-in. sewer main, \$129,300; construction of a municipal incinerator, \$300,000 to \$500,000; installation of 6,000

ft. of sewer pipe, \$34,200; park development, \$47,000, and street improvements, \$131,000.

Havre

WATER SHORTAGES experienced during the summer months of several past years have caused voters of Havre, Mont., to pass bonds in the amount of \$400,000 to proceed with construction of new water supply facilities, including a storage reservoir, treatment plant, and new mains. The source of the new supply would be the Milk River. The City Council has authorized early construction.

Los Angeles County

THE LARGEST construction program of any Western county will probably be carried out in Los Angeles County. The work will be divided among several County departments.

During the year 1950, the Sanitation Districts of Los Angeles County propose to complete construction totaling \$4,321,000, according to A. M. Rawn, Chief Engineer and General Manager. The work in general will involve extension of existing sewers, supplementing parts of the outfall system, extending a 12-ft. tunnel through the Palos Verdes Hills, extension of trunk sewerage in the newly formed District 18. One of the most important items will be the sewerage of East Long Beach and Lakewood Village, for which it is proposed to build permanent facilities to provide service in the amount of 25 cfs. in 1950.

As reported by M. E. Salisbury, Senior Assistant Chief Engineer of Los Angeles County Flood Control District, the construction program for that organization will total approximately \$4,685,200. The largest single item is construction of a concrete floodway in Dominguez Channel in the vicinity of Los Angeles Airport at a cost of \$1,034,000. Other large items are: a sluiceway at San Gabriel Dam No. 1, to cost \$500,000; 5

bridges over Tujunga Wash, estimated to cost \$542,300; bridges over the Los Angeles River at Coldwater Canyon Ave. and Fulton Ave., \$225,000; 5 bridges over Live Oak Wash, \$345,000; 2 bridges in the Sawtelle-Westwood Project, \$132,000, and 3 bridges over Compton Creek, \$480,000.

In addition, it is anticipated that Federal construction during the 1950 calendar year will advance to the point where 3 additional bridges will be required in Tujunga Wash, estimated at \$345,000; and 4 bridges over Pacoima diversion channel, estimated to cost \$185,000.

Local sanitary sewers to be constructed by the County Engineer will have an aggregate value of \$3,410,750, according to T. I. Phelps, Assistant Sanitation Engineer. In addition, over 100 mi. of sanitary sewers will probably be constructed under private contract for new subdivisions, industries, etc., at an estimated cost of \$2,500,000. The largest single item included in the County's program will be sewers in Sinaloa Ave., Altadena, 38,000 ft. long, and estimated to cost \$218,000. Other of the larger projects include: Shreve Rd., Whittier, 32,660 ft., \$171,300; 133rd St., Hawthorne, 29,000 ft., \$162,100; El Molina Ave., Altadena, 38,000 ft., \$163,000, and Fern Ave., Garvey, 32,000 ft., \$154,400.

In addition, an extensive construction and maintenance program will be carried out by the County Road Department under the direction of O. F. Cooley, Road Commissioner.

Federal Building Jobs Set for Western Cities

SELECTION of 312 federal building projects has been announced by Jess Larson, Administrator of General Services and Jesse M. Donaldson, Postmaster General, for construction under Public Law 105 passed by the last session of Congress. This law authorizes a \$40-million appropriation for site acquisition and plan preparation of such projects. It is estimated that the total construction cost of the projects will be approximately \$377,000,000. The list of projects includes 190 selected under previous similar programs, but deferred by presidential order during the national defense program. Most of the projects are post offices. They were selected from a list of approximately 4,000 previously determined as eligible. The list is widely distributed over the country because Congress expressed the desire in the law that each congressional district participate "in the benefits that will accrue from the future construction."

Western projects which will participate in the program include the following: In Arizona, post offices at Coolidge and Tempe, each of which will cost about \$275,000; in California, a post office in Los Angeles to cost \$6,800,000, another in San Francisco to cost \$3,180,000, another in Bakersfield to cost \$1,830,000, and 13 other projects, mostly post offices, at a total cost of \$3,500,000; in Colorado, Denver will get a new terminal annex post office estimated to cost \$3,380,000; in Montana, Whitefish and

Livingston will each have a new post office, and Del Bonita, Morgan, Turner, Whitetail, Wild Horse Trail and Willow Creek will all receive new border stations, each to cost less than \$200,000, and Billings will have a new federal office building, estimated to cost \$4,770,000.

In Nevada, the city of Sparks will get a new post office; in New Mexico, a border station will be built at Antelope Wells; seven new border stations will be built in North Dakota at an aggregate cost of \$265,000; in South Dakota, Rapid City is to acquire a new post office at a cost of \$1,020,000. In Texas, new post offices will be erected at McKinney, Garland, Grand Prairie, Waxahachie, Killean, Denton, Refugio, McCamey, Leveland, San Saba and Dublin, ranging in cost from \$525,000 down; in Washington, a new post office is to be built in Seattle at a cost of \$8,000,000, another in Tacoma at a cost of \$4,200,000, and a third at Vancouver estimated at \$790,000. Smaller buildings will be border stations at Point Roberts and Nighthawk, a post office at Kirkland and one at Cashmere; and in Alaska a federal office building is to be built at Anchorage at an estimated cost of \$4,440,000.

Research Laboratory Site Chosen at Boulder, Colo.

THE DEPARTMENT of Commerce has announced selection of Boulder, Colo., as the site of a laboratory to be built by the Bureau of Standards for radio research. The laboratory is estimated to cost about \$4,500,000, and will be located on a tract of 215 ac. south of the city. The land is being furnished by the Boulder Chamber of Commerce. The laboratory was authorized in the last session of Congress, but the funds are still to be appropriated.

Record School Construction

DURING 1950 school districts in British Columbia will carry out a \$12,000,000 school construction program, according to the Hon. W. T. Straith, K.C., Minister of Education. The school population of British Columbia during 1949 increased by 10,000, to an all-time record of 162,000.

Value of new buildings erected during the present year approximates \$6,000,000, the Minister stated. This does not provide for the development of the school population. Only one major school was built in Vancouver, the Technical School.

"The school population has gone up from 125,000 to 162,000 in the last four years or by 30 per cent," according to Straith. He added that by 1951 there will be need for 400 additional classrooms.

WHEN A RUSH CALL for polio equipment comes in, the National Foundation for Infantile Paralysis is ready. Iron lungs, hot pack machines and other equipment are stored at six strategic spots in the nation. Your March of Dimes funds accomplish this. Give generously now.

Large Contracts Awarded in Western States During 1949

ARIZONA

Arizona Sand & Rock Co.—Highway near Tucson.....	\$ 514,078
Arizona Sand & Rock Co.—Water main at Phoenix.....	566,215
Fisher Contracting Co.—Canal on Gila Project.....	1,385,463
Rubenstein Co.—Housing at Williams Air Force Base.....	5,000,000
M. M. Sundt Construction Co.—Hospital at Tucson.....	1,078,125
Vinnell Co., Inc.—Ashfork-Williams highway.....	609,976
Del E. Webb Construction Co.—Hospital at Phoenix.....	3,161,000
J. H. Welch & Sons—Power Plant at Nogales.....	700,000

CALIFORNIA

Alliance Construction Co.—Buildings at Point Mugu.....	1,191,070
American Pipe & Construction Co.—Coachella Canal laterals.....	2,049,922
American Pipe & Construction Co.—Pipeline at Los Angeles.....	2,888,196
Artukovich Bros. and Steve P. Rados—Hetch Hetchy pipeline.....	4,097,546
Guy F. Atkinson Co.—Overcrossings on Hollywood Freeway.....	914,158
Guy F. Atkinson Co., Bressi & Bevanda Constructors, Inc., Charles L. Harney, Inc., J. A. Jones Construction Co., and A. Teichert & Son, Inc.—Pine Flat Dam.....	24,339,776
Guy F. Atkinson Co. and Charles L. Harney, Inc.—Bayshore Freeway.....	2,819,379
Guy F. Atkinson Co., A. Teichert & Son, Inc., Bressi & Bevanda Constructors, Inc., and David G. Gordon Co.—Tunnels on Owen Gorge Project.....	8,947,520
Project.....	8,947,520
N. M. Ball Sons—Hollywood Parkway.....	938,108
N. M. Ball Sons—Hollywood Parkway.....	1,287,397
N. M. Ball Sons, Harms Bros. and H. Earl Parker—Los Angeles Airport.....	3,336,510
James I. Barnes Construction Co.—Engineering school at Berkeley.....	1,084,000
James I. Barnes Construction Co.—Hospital at Patton.....	1,230,610
Barrett & Hilp—Building at Berkeley.....	1,300,000
Barrett & Hilp—School building at Stockton.....	2,269,488
Baruch Corp.—Transit sheds at Los Angeles.....	942,150
Baruch Corp.—Warehouse at Los Angeles.....	1,579,000
Bechtel Corp.—Industrial plant at Los Angeles.....	20,000,000
Bechtel Corp.—Refinery at Torrance.....	2,250,000
Bressi & Bevanda Constructors, Inc.—Los Angeles River channel improvement.....	1,854,624
Cahill Bros.—Planetarium at San Francisco.....	942,800
Cahill Bros.—School at San Francisco.....	2,507,570
Clinton Construction Co.—Auditorium at Richmond.....	1,735,900
Dinwiddie Construction Co.—Auditorium at Berkeley.....	1,061,600
Fred J. Early, Jr., Co., Inc.—Sewage plant at Berkeley.....	787,500
Eaton & Smith—Highway in Santa Clara County.....	888,193
C. M. Elliott & John C. Gist—Keswick power plant.....	1,239,409
Hubert H. Everist, Sr.—Delta-Mendota Canal.....	3,679,107
Fluor Corp., Ltd.—Gas plant near Cuyama.....	4,500,000
Fredericksen & Kasler—Highway in San Bernardino County.....	1,143,443
Fredericksen & Kasler—Highway in San Luis Obispo County.....	1,039,500
Frederickson & Watson Construction Co.—Eastshore Freeway.....	1,337,819
Ben C. Gerwick and George C. Pollock Co.—Outfall sewer at Oakland.....	1,687,916
Griffith Co.—Airport at Point Mugu.....	998,700
Haddock-Engineers, Ltd.—Housing at Inyokern.....	1,920,500
J. F. Haddock, Ltd.—Ramona Parkway.....	1,225,490
Guy E. Hall—School buildings at Arvin.....	1,618,883
Charles L. Harney, Inc.—Sewers in San Francisco.....	1,039,903
Healy Tibbitts Construction Co.—Outfall sewer at Oakland.....	1,267,071
R. A. Heintz Construction Co.—Railroad relocation near Redding.....	1,744,619
Hermann Co.—Sewage plant at Santa Barbara.....	635,815
Johnson-Western-Tavares—Housing project at La Jolla.....	1,750,000
M. F. Kemper Construction Co.—Baldwin Hills reservoir.....	1,111,566
Peter Kiewit Sons' Co.—Friant-Kern Canal.....	7,494,380
Peter Kiewit Sons' Co.—Ridge Route highway.....	874,114
Peter Kiewit Sons' Co. and Fred J. Early, Jr., Co., Inc.—Hyperion sewage plant at Los Angeles.....	6,170,337
M & K Corp., Fredrickson & Watson Construction Co. and Piombo Construction Co.—Lake Merced sewer.....	916,485
M & K Corp., Fredrickson & Watson Construction Co. and Piombo Construction Co.—Prison building at Soledad.....	4,488,000
M & K Corp., Fredrickson & Watson Construction Co. and Piombo Construction Co.—Sewer tunnel at San Francisco.....	1,381,530
Charles MacClosky Co., R. E. Hazard Co. and C. G. Willis & Sons—Highway bridges at National City.....	1,284,270
Macco Corp. and Morrison-Knudsen Co., Inc.—Breakwater at Crescent City.....	3,245,375
MacDonald, Young & Nelson and Morrison-Knudsen Co., Inc.—Hyperion sewage treatment plant.....	4,486,000
MacIsaac and Menke—Factory at Torrance.....	1,100,000
Matich Bros. and E. L. Yeager—Channel improvements at Los Angeles.....	1,220,693
Herbert Mayson—Agnew State Hospital.....	1,817,814
Robert E. McKee—Barracks at Point Mugu.....	1,586,900
McNeil Construction Co.—Cement mill at Palm Springs.....	15,000,000
John J. Moore Co.—Warehouse at San Francisco.....	8,000,000

Tabulation continued on page 75

County Engineers' Outlook for 1950

THE UPWARD trend in county highway construction for 1950 will be most pronounced in the counties of average population, according to reports from county engineers in Western states. The counties with heavily populated centers are in most cases planning slightly less construction for 1950 than they did during the record-breaking years immediately after the war. The counties with relatively small population are planning less new construction for the new year than in 1949, with the exceptions of counties in the State of Washington and several isolated counties that are receiving federal and state aid not available last year.

Washington, one of the few states where every county has an engineer, has shown more activity in the problem of providing better county roads than any other western state. With a general rise in gas tax funds, and with many counties receiving new FAS help, increased county road and bridge construction in Washington is a certainty for 1950. This trend will be increased by emergency repairs to flood-damaged roads and bridges, where high water has had a serious effect on county engineers' operations.

Washington county engineers anticipate a widespread rise in new bridge construction, provided that their bridge funds are not too depleted by flood damage of previous years. Many counties anticipate a rise in 1950 expenses for heavy equipment. Little activity is to be expected for enlargements and equipment for county maintenance shops, as most counties reported no increase in this budget item over 1949, and many reported no anticipated money spent at all. The most significant facts reported from

Increased new construction forecast chiefly in counties with average population—Legal limits on force-account work and standard equipment rental rates are major problems

Washington counties indicate a general rise in 1950 county budgets, with the largest increases shown by the poorer counties, and a large increase in the number of miles of resurfacing to be done on existing roads. This increase in resurfacing approaches 200% in some cases. More than any other state reporting, Washington counties are planning the largest increases in their technical staffs.

California counties

California, for a long time dominant in funds for county road construction, reports continued heavy activity for 1950; without, however, the widespread general increases anticipated by the Washington county engineers. Income and expenses, when compared to last year, vary widely in most counties, with no marked increase expected from gas taxes, federal aid or other sources.

Grading and surfacing of new roads tends to be on the decrease, as expected maintenance of existing roads will take more funds during 1950. An increase in bridge work is scheduled, and some engineers are planning to double new bridge construction over last year. Expenditures for heavy equipment in 1950 show the greatest increases in the poorer and less populated counties. Although the large California counties will spend considerable sums on new road equipment, as they did in 1949, the totals will

not equal those of previous years. Few counties reported any anticipated enlargement of engineering personnel.

Oregon counties

Oregon's reports indicate that the budgets showing the largest increases are in the state's most populated counties. To those counties that received FAS funds last year, the 1950 programs show a small increase in the allotments. New road construction is limited to the more prosperous counties, although most of the counties show an increase in resurfacing to be done to existing roads. As always, heavy maintenance costs hit large and small counties alike. Funds allocated for heavy equipment are higher than last year in the poorer counties.

A year of panel discussions

Judging from the panel discussions held during various county engineering meetings last year there will be few immediate, specific improvements to be noted in county highways in the West. However, there is one specific problem, involving the increasing deficiency in funds for adequate construction, that received increased attention during 1949, and is certain to be continually discussed at the 1950 meetings of county engineers.

The solution to this problem would be the strict adherence by the heavy trucking industry to speed limits and maximum allowable axle loads. Overloads on county roads rank with earthquake, flood, and general deterioration for expensive damage done. Strict adherence to speed and load limits in one of the few immediate corrections which can be applied to the West's widespread county road troubles.

Western county engineers are agreed that width is a prime factor in the life of a road. The outside dual-wheel on trucks invariably breaks down the edge of farm-to-market pavements inch by inch. Nine miles of 20-ft. width costs less in the long run than 10 mi. of 18-ft. width.

As is true year after year, maintenance was discussed by county engineers more frequently than any other subject. At the rate the cost of maintenance work is increasing, the bulk of street, road, and highway revenue will soon be devoted to the maintenance side of the ledger.

Administration and executive problems are being discussed more and more by the county engineering staffs. Cooperation with the state highway departments and the Bureau of Public Roads is now an important consideration. One of the best signs that this cooperation will continue is the prom-

SPECIAL spreader box used by Imperial County, Calif., is typical of devices used by Western counties to stretch the road dollar. The spreader lays fine sand on sub-base, and a regular spreader follows with aggregate. More speed and control of road-mix is the result.



innence given to the subject at annual meetings of the county engineers.

Some features of 1950

Important points which will be considered by counties during 1950 are: 1. Legal limits of force-account work performed by counties. Washington has settled the question, temporarily at least, under its new 10-year county road planning program. California reacted rather violently last year (WCN, Sept. 15, 1949, page 91) after a surprise district court ruling that slapped a \$3,000 force-account limitation on county work. After two months of ambiguity, the court reversed itself and the limit was lifted, giving at least temporary reprieve to the present county road repair systems. There are indications that the question will arise again throughout several of the western states.

2. For a long time equipment rental rates in the different states have varied with each county. The standardization of county bookkeeping systems is an arduous task, but is doubly important because of the detailed financial reports to be submitted each year to the state. The new year will see an effort to improve county bookkeeping consistency.

3. The jurisdictional problem of county or city or state will continue. Should the city take over those county roads and bridges within the city limits? Should state highway maintenance be done in whole or part by counties, working under contract to the state? How can "fringe areas"—those areas ready for annexation by the city—be serviced with streets and with city utilities at no expense to the county? These questions are not new and have led to friction between councilmen and commissioners on one side, and the extra-suburban population on the other. The new year will probably see a general hardening in the attitude of local government toward those families living outside city limits and (1) expecting city services (2) causing undue hardships on county administrations (3) paying only the county taxes, instead of assessments for local improvement districts or to the city.

Typical problems

Typical of the situation that exists in many western counties is this report from a county surveyor in one of the intermountain states. "Only 1½ mi. of actually new roads have been built. Twelve miles (of old road) has been elevated and reconstructed and surfaced with crushed rock, and 2½ mi. regraded and surfaced with black-top.

"No new bridges have been built, but owing to increased tonnage requirements, 400 lin. ft. of pile and timber flat spans and 100 lin. ft. of truss spans have been replaced.

"The county has over 1,400 mi. of road and 16,000 lin. ft. of bridges. Due to the fact that much of the county is non-taxable Indian, Federal, or State land, the taxable valuation is only \$7 million. Except for emergency cases, the maximum levies which are fixed by statute are barely adequate for minimum maintenance."

Large Contracts of 1949 . . . *Continued from page 73*

Moore & Roberts—Hospital at Talmadge.....	1,594,777
Morrison-Knudsen Co., Inc. and Bechtel Corp.—San Joaquin power project.....	19,400,000
Morrison-Knudsen Co., Inc. and M. H. Hasler—Delta-Mendota Canal.....	4,273,872
Morrison-Knudsen Co., Inc. and M. H. Hasler—Delta-Mendota Canal.....	2,173,890
Newbery Electric Corp.—Power and light at Hyperion sewage project.....	1,151,672
Parker, Steffens & Pearce—Hospital at Redwood City.....	1,792,000
Stanton-Reed Co.—Hospital at Los Angeles.....	1,610,729
Stolte, Inc., Duncanson-Harrelson Co., United Concrete Pipe Corp. and Ralph A. Bell—Tracy switchyard.....	978,720
Swinerton & Walberg Co.—Capitol building at Sacramento.....	4,155,729
Trewhitt-Shields & Fisher—Hospital at Tulare.....	1,078,600
Utility Construction Co.—Pipeline in San Diego County.....	2,500,000
United Concrete Pipe Corp.—Hetch Hetchy pipeline.....	4,246,464
United Concrete Pipe Corp.—Highway near Stockton.....	1,067,954
United Concrete Pipe Corp., Ralph A. Bell, Westbrook & Pope—Highway in Placer County.....	1,107,656
William C. Warmington Construction Co.—Housing at Whittier.....	1,800,000
Western Contracting Corp. and Hubert Everist, Sr.—Delta-Mendota Canal.....	4,165,764
Williams & Burrows, Inc.—School at Sonoma.....	1,230,000
Williams & Burrows, Inc. and Carl N. Swenson—Hospital in Ventura County.....	2,570,715
Williams & Burrows, Inc. and Carl N. Swenson—Schools at San Jose.....	1,867,000
F. E. Young Construction Co.—Hospital at Brawley.....	1,140,452

COLORADO

Thomas Bate & Sons Co.—Sewage treatment plant at Denver.....	1,461,000
Colorado Constructors, Inc.—Highway in Clear Creek County.....	444,074
Electric Constructors and C. M. Elliott—Transmission lines at Estes Park.....	986,000
Hinman Brothers Construction Co.—Platoro Dam.....	2,727,792
Mead & Mount Construction Co.—Hospital at Pueblo.....	2,083,000
Mesa Constructors—Hospital at Grand Junction.....	1,587,871
N. G. Petry Construction Co.—University of Denver buildings.....	2,000,000
Swinerton & Walberg—Industrial plant at Denver.....	1,500,000
Swinerton & Walberg—Stadium at Denver.....	1,275,615
Western Paving Construction Co.—Horsetooth feeder canal features.....	2,369,654
Wunderlich Construction Co.—Tunnels in Colorado-Big Thompson Project.....	4,787,874

IDAHO

Bechtel Corp.—Reactor plant at Arco.....	2,500,000
Brennan & Cahoon—Hospital at Pocatello.....	1,219,160
Henry Hagman and Erickson Paving Co.—Clearwater River bridge.....	539,191
Oklahoma Contracting Co. and Grafe-Callahan Construction Co.—Boise to Pasco pipeline.....	6,000,000
Puget Sound Bridge & Dredging Co. and Macco Corp.—Lucky Peak dam.....	1,169,755

KANSAS

C. F. Lytle Co., Amis Construction Co., San Ore Construction Co.—Cedar Bluff Dam	11,350,735
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MONTANA

Anderson Construction Co.—Overpass at Great Falls.....	1,174,129
J. C. Boespflug Construction Co.—Hospital at Missoula.....	2,000,000
Canyon Constructors, Inc. (Brown & Root, Inc., Wunderlich Contracting Co., Griffith Co. and Maguire & Co.)—Canyon Ferry Dam.....	11,896,425
S. J. Groves & Sons Co.—Highway in Toole County.....	503,161
W. P. Roscoe Co.—Bridge near Huntley.....	623,848

NEBRASKA

Knisely-Moore Co.—Superior-Courtland Dam.....	866,263
Marshall, Haas & Royce—Trenton Dam foundation.....	1,626,250
J. A. Terteling & Sons—Courtland canal near Superior.....	1,266,056

NEVADA

M. J. Brock & Sons, Inc.—Hotel at Reno.....	1,500,000
Dodge Construction Co., Inc.—Highway in Humboldt County.....	396,024
Isbell Construction Co.—Highway near Reno.....	398,186
McNeil Construction Co.—Housing project at Las Vegas.....	5,000,000
Nomellini Construction Co.—School at Reno.....	2,643,363
Richter Bros., W. H. Darrough & Sons and M. J. Ruddy & Son—Harmony Ridge Road	429,899

NEW MEXICO

R. J. Daum Construction Co.—Building at Sandia Base.....	2,881,114
Haddock-Engineers, Ltd. and Associates—Housing at Los Alamos.....	5,405,760
Lembke Construction Co.—Building at Santa Fe.....	777,209
Robert E. McKee—Building at Los Alamos.....	1,390,400
Robert E. McKee—Housing at Sandia Base.....	1,572,000
D. D. Skousen—Tucumcari lateral canals.....	634,022
Wylie Bros.—Carlsbad to Hobbs highway.....	377,594

NORTH DAKOTA

Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc.—Garrison Dam.....	5,740,400
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OREGON

Guy F. Atkinson Co.—Sewerage at Portland.....	647,748
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Consolidated Builders (General Construction Co., J. F. Shea Co., Kaiser Engineers, Inc., Walsh Construction Co. and Utah Construction Co.)—

Detroit Dam	28,230,509
Dragline Rentals Co.—Ochoco Dam repairs	573,545
General Construction Co.—Sewerage at Portland	983,950
Edwin C. Gerber—Oregon Coast Highway	792,215
L. H. Hoffman—Sewage plant at Portland	980,620
Peter Kiewit Sons' Co.—Sewage tunnel at Portland	2,589,133
McNary Dam Constructors (Guy F. Atkinson Co., Ostrander Construction Co. and J. A. Jones Construction Co.)—McNary Dam	15,835,539
C. J. Montag & Son—Pacific Highway	986,853
Pacific Dredging Co.—Dredging at Coos Bay	870,611
Parker-Schram Co.—Levees at Richland	417,802
W. C. Smith, Inc.—Housing project at Roseburg	1,500,000
Sound Construction & Engineering Co.—Office building at Salem	1,599,931
Utah Construction Co.—Highway relocation at Meridian Dam	1,178,057
Valley Construction Co.—Grade separation at Dewey	434,547

SOUTH DAKOTA

S. J. Groves & Sons and J. L. McLaughlin—Shadehill Dam	5,116,796
Silas Mason Co.—Fort Randall tunnel	8,585,808
McCarthy Improvement Co.—Fort Randall reservoir	10,977,836
Northwestern Engineering Co.—Highway near Stanton	448,748

UTAH

Bechtel Corp.—Refinery at Salt Lake City	10,000,000
W. W. Clyde & Co.—Highway in Summit County	393,641
W. W. Clyde & Co.—Scipio to Levan highway	462,907
Grafe-Callahan Construction Co. and Rhodes Bros. & Shofner—Duchesne tunnel on Provo River project	4,379,961
L. T. Johnson Construction Co.—Highway in Weber County	480,000
Mountain Fuel Supply Co.—Pipeline from Coalville	1,750,000

WASHINGTON

Guy F. Atkinson Co.—Bridge near Bridgeport	946,620
Guy F. Atkinson Co.—Highway in Cowlitz County	1,084,358
Guy F. Atkinson Co.—Potholes East Canal	937,602
Curtis Gravel Co.—Highway in Asotin County	883,796
Goodfellow Bros.—Highway in Douglas County	871,589
L. H. Hoffman—Industrial plant at Vancouver	7,000,000
Peter Kiewit Sons' Co.—Columbia River Highway	998,673
Peter Kiewit Sons' Co.—Highway	814,482
Peter Kiewit Sons' Co.—Willamette Highway	618,289
Kuney, Johnson Co.—Building at Seattle	2,584,000
MacDonald Building Co.—Hospital at Steilacoom	1,260,338
Manson Construction & Engineering Co.—Agate Pass Bridge	1,398,439
Morrison-Knudsen Co., Inc.—Columbia River channel improvements	1,691,666
Morrison-Knudsen Co., Inc.—West Canal	6,136,234
Nels Mortensen & Co., Inc.—Housing at Moses Lake Air Force Base	3,500,000
Northwest Construction Co.—Paving at Seattle	808,546
Pacific Bridge Co.—Grand Coulee Dam repairs	1,804,840
Rumsey & Co.—Tunnel at Seattle	547,668
J. A. Terteling & Sons, Inc.—East Low Canal, etc.	8,029,762
J. A. Terteling & Sons, Inc.—North Dam and canal	4,718,725
J. A. Terteling & Sons, Inc.—Railroad at Richland	1,060,000
J. A. Terteling & Sons, Inc.—Winchester Wasteway on Columbia Basin Project	1,088,817
Westinghouse Electric Corp.—Generators for Ross Dam powerplant	4,454,222
Howard S. Wright & Co.—Shopping center near Seattle	6,500,000

WYOMING

Peter Kiewit Sons' Co.—Highway in Crook County	442,933
Smith Hi-Line Co.—Power Lines	1,025,096

ALASKA

B & M Construction Co.—Utilities at Ladd Field	2,260,500
J. C. Boespflug Construction Co., Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc.—Hospital at Anchorage	4,612,354
Brady Construction Co. and A. C. Swalling Co.—Schools at Anchorage	1,381,020
Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc.—Housing at Ladd Field	2,063,000
Lewis Construction Co.—Housing at Anchorage and Juneau	15,000,000
C. F. Lytle Co. and Green Construction Co.—International Express Airport	8,679,142
Manson Construction Co. and Osberg Construction Co.—Seawall at Nome	1,063,900
Morrison-Knudsen Co., Inc.—Airport at Fairbanks	2,845,728
Morrison-Knudsen Co., Inc. and Peter Kiewit Sons' Co.—Facilities at Fort Richardson	1,331,225
Morrison-Knudsen Co., Inc. and Peter Kiewit Sons' Co.—Facilities at Fort Richardson	1,588,584
W. A. Smith Co. and Brown & Root, Inc.—Railroad rehabilitation	4,900,413

CANADA

Campbell Bennett, Ltd.—Pacific Great Eastern Railway	1,119,694
Gilley Bros., Ltd.—Jetty at Stevenston, B. C.	1,300,000
Marwell Construction Co., Ltd.—Hospital at Vancouver	1,086,326

(NOTE: Large contracts awarded during December are not included in the foregoing tabulation but may be found on page 100 of this issue.)

A. G. C. Will Reward Plan For "Constructiondising"

THE ASSOCIATED General Contractors of America has established an annual reward of \$100, with an appropriate certificate to be given to the person, party, or place which presents the best new plan, procedure, or project for a program of "constructiondising."

"Constructiondising" has been defined as the process of construction merchandising in current competition with other items of necessity, convenience, or enjoyment for the purchasers' daily dollars. It should tend to develop new civil construction markets through private enterprise, or to better industrial relations.

The competition is open to all, and each competitor should send in his suggestion or idea to the Construction Design Award Committee of A.G.C., 1227 Munsey Bldg., Washington, D. C., not later than Feb. 1, 1950, to be eligible for this year's award, which it is anticipated will be presented during the annual convention in San Francisco at the end of February. Further details as to form of the entry may be obtained from the committee in Washington or from one of the local A.G.C. offices.

Utah Oil Firm Will Expand Facilities During 1950

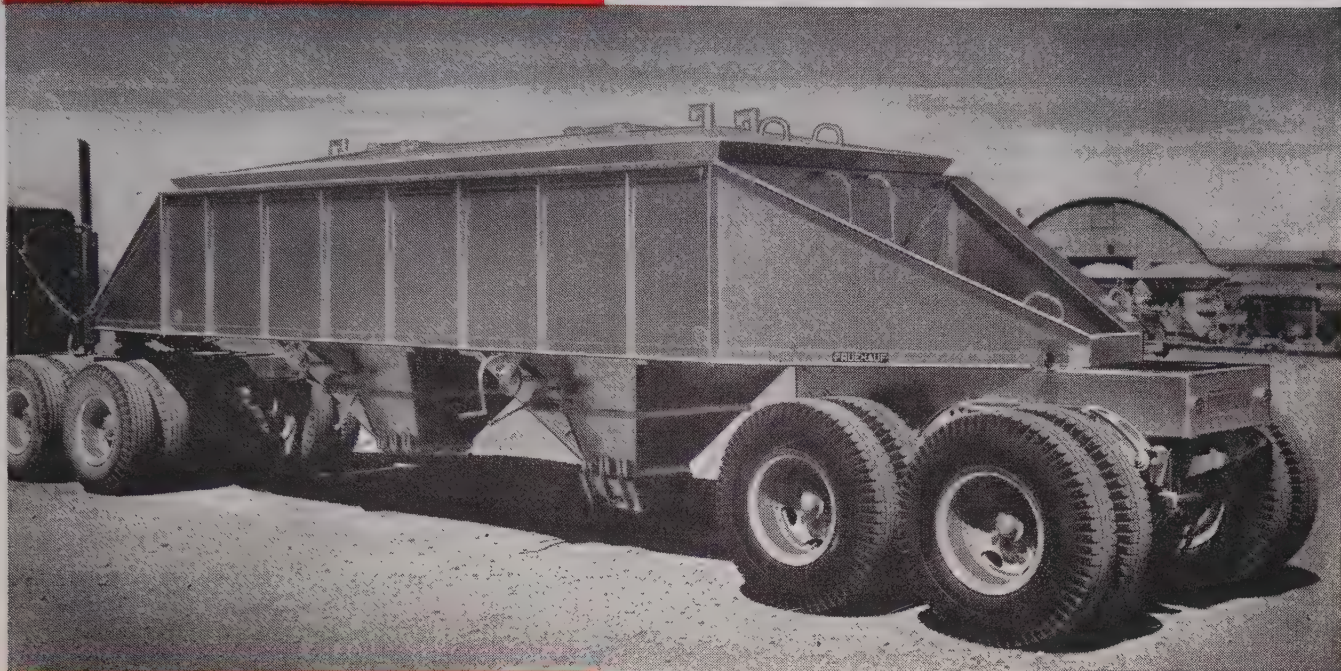
A CONSTRUCTION program of \$1,800,000 has been announced by Utah Oil Refining Co., Salt Lake City, for 1950. The work is to expand the company's storage and loading facilities and to develop some new outlets for its products.

Already under contract to Morrison-Knudsen Co., Inc., is a storage facility at Burley, Ida., to cost \$300,000. Other major projects anticipated in 1950 include a warehouse and storage center at the Salt Lake City refinery, to cost \$500,000, and a \$250,000 terminal at Boise, Ida. Both the Burley and Boise installations will accommodate about 5,000,000 gal. of gasoline, Diesel fuel, and burner oil.

Big Horn River Diverted Through Boysen Dam Tunnel

THE BIG HORN River has been diverted past the site of Boysen Dam, through the diversion tunnel driven for the purpose by Morrison-Knudsen Co., Inc., the contractor on the job. Diversion was made at this time to take advantage of the low winter flow, only about 400 cu. ft. per sec. passing through the channel at the time. Normal summer flow is from 4,000 to 5,000 cu. ft. per sec.

Other work now completed on Boysen Dam includes relocation of 13.2 mi. of the Burlington Railroad and excavation of the right abutment. Excavation in the channel will now commence. It is believed the dam will be completed by December 1951.



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Cement or Gravel

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It really is convertible—with covers on for hauling cement, covers off for hauling gravel. Big legal payloads—up to 550 cu. ft. of cement or 16½ cu. yds. of gravel. It is light—unladen weight does not exceed 11,200 lbs.—yet sturdy and strong.

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Fruehauf is the name that carries weight. When you want to carry more weight *longer, safer and at lower cost*, you want a Fruehauf Trailer. In addition to Hopper Dumpers, Fruehauf builds End and Side Dumpers, Machinery Trailers, Tilt-Deck Trailers—any type of Trailer for any Trailer use.

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WORLD'S LARGEST BUILDERS OF TRUCK-TRAILERS

Contractor-Engineer Cooperation Will Be Strengthened by— The ASCE-A.G.C. Joint Committee

DURING its brief history, the Joint Cooperative Committee of the American Society of Civil Engineers and The Associated General Contractors of America has undertaken work which will be of benefit to civil engineers, general contractors, the construction industry generally, and the public.

The committee was established in 1948 as a continuing medium for the interchange of information and ideas between the two organizations, and for developing recommendations which envisage improvements in the construction industry.

For an interchange of ideas

One of the beliefs leading to the formation of the cooperative committee is that civil engineers and general contractors are part of a team whose common objective is more efficient and economical construction. The better engineers and contractors know each other and understand each other's problems and the more they work in an atmosphere of mutual respect and understanding, the better they will do their job of helping to build a greater nation.

While many details of relations between engineers and contractors and of industry operations are considered in meetings of the committee, thought also is given to those broader problems of the industry and the national welfare toward which individuals of each group can make positive contributions.

The cooperative committee does not seek to supersede in any way the work or objective of either organization. Rather, its purpose is to study problems

In the future, it is hoped that the new ASCE-A. G. C. Joint Cooperative Committee will develop recommendations proving of direct benefit to the entire construction industry

By ADOLPH TEICHERT, JR.
President, The Associated General
Contractors of America
President, A. Teichert & Son, Inc.
Sacramento, Calif.

and make recommendations to the respective national organizations.

Nor does the national committee seek to disrupt the relationships between civil engineers and general contractors in their respective communities. It does seek to serve as a national clearing house for the interchange of ideas and as a model for the establishment of local committees to carry out the same objectives.

Subjects for joint study

The subjects which have come before the joint cooperative committee for study fall into several general categories, such as:

Education, training and placement of young engineers with contracting organizations, engineering firms or governmental agencies.

Equitable and clearly understandable bidding and awarding procedures for engineering construction.

Standard contract clauses for engineering construction, clearly understandable by engineers and contractors.

Clear and definite specifications thoroughly understandable by all parties.

Design which can obtain maximum benefit from mechanized construction operations.

Use of most efficient methods of engineering construction and means of securing maximum economy.

General betterment of industry operations so that the public is served best.

World War II has been described as an engineer's war, because there had to be and was the closest of cooperation between engineers and contractors. The benefits of this close cooperation became even more evident than ever before. So after the war and the immediate postwar period, when it became possible for national societies and associations to turn once again to matters of long-range benefit to their members, it became almost automatic that there should be a formally established committee through which the ASCE and the A.G.C. could cooperate on a regular and continuing basis.

In the past, the A.G.C. and the ASCE had cooperated on many problems, and their presidents had spoken at each other's annual meetings. The new committee has permitted this cooperation to be on a continuing basis.

On June 8, 1948, an exploratory meeting was held between R. E. Daugherty, New York, then president, and William N. Carey, executive secretary, of the ASCE, and Dwight W. Winkelman, Syracuse, N. Y., then president, and H. E. Foreman, managing director, of the A.G.C. As a result of this meeting, the recommendation was made to each group that the joint cooperative committee be established.

Active cooperation possible

At this meeting it was determined that an area of active cooperation exists between the two organizations. The four men recommended a general statement of policy, which subsequently was adopted for guidance of the committee's work, as follows:

"It was mutually proposed that there be appointed from each organization a committee of three, the six to meet and correspond as occasion may demand to consider problems of mutual concern to engineers, contractors and the public.

"The authority of the committee as a whole, or of either component, to be confined to study, review and recommendation to their organizations. It is the intent that the proposed joint cooperative committee shall not in any way supersede or interfere with the ob-

ADOLPH TEICHERT, JR., left, author of this article, being congratulated at the time of his election as 1949 President of National A. G. C. The congratulator is retiring president **DWIGHT W. WINKELMAN** of Syracuse, N. Y., now Co-Chairman of the Joint Committee.





KIRBY SMITH of Raymond Concrete Pile Co., New York City, represents ASCE as Co-Chairman of the Joint Cooperative Committee.

activities or activities of existing committees of either society."

After approval was given by each, the announcement of its formation was made on September 24, and the first meeting was held November 17. The committee has now been active only a little more than a year.

Since that time a second meeting was held March 2, 1949, at New York City in connection with the A.G.C. 30th annual convention, and November 1 at Washington, D. C., in connection with the ASCE fall meeting. The next meeting will be held at New York City in January, 1950, during the ASCE annual meeting.

Aiding young engineers

One of the first subjects discussed by the Joint Cooperative Committee was the education, training and placement of young engineers. At its last annual convention, the A.G.C. voted not to seek to reestablish student chapters but to cooperate with the ASCE and other societies in the work of their student chapters. A.G.C. cooperation has been recommended with engineering schools and ASCE members in the development of construction courses. Means have been explored for contractors to give summer employment to engineer students, and to place them in construction jobs after graduation. Also discussed have been means of making construction more attractive to young engineers, and to secure adequate pay scales so that they will be attracted to government work where there are shortages of engineers.

Upon recommendation of the Joint Cooperative Committee, special joint committees are being appointed to study possible revisions of the Standard Contract for Engineering Construction, originally adopted in 1925, and the Financial Statement for Bidders for Engineering Construction.

The committee has before it the *Suggested Guide to Bidding Procedure*, de-

veloped jointly by the American Institute of Architects and the A.G.C., for study in the possible development of a similar suggested guide to bidding procedure on privately financed engineering construction.

Both engineers and contractors recognize that there is need for constant study of specifications so that they can be written to be definite and clearly understandable by all parties.

Other discussions of the committee have been on the problems of design so that maximum advantage can be taken of mechanized operations, so that engineers can have the benefit of contractors' knowledge of costs when considering various methods of designing projects.

Use of the contract method as a means of securing most efficient and economical construction has been studied by the committee, and a subcommittee has been appointed to give further study to the problem. It is likely that the joint committee will adopt a statement which can be recommended to the respective organizations, and to government agencies and others as well for guidance.

The use of private engineering firms for the design of public works projects also has been considered.

In the A.G.C., we consider work of the Joint Cooperative Committee of great importance. Much of the work of the association is directed toward cooperating with other groups identified with the industry.

We believe that much of the long-range work which will be of benefit to our members, to the industry generally and to the public must come through joint activities with other societies and organizations in the industry.

We believe that this work can be done best when it is carried out in an atmosphere of mutual respect and understanding, such as characterizes the work of this cooperative committee.

Both organizations have selected men of outstanding character and ability as their representatives. At the present time each group has three representatives on the committee as well as a co-secretary. The presidents of each or-

The Committee—

ASCE Members:

Kirby Smith, Raymond Concrete Pile Co., New York City, Co-Chairman.

Gail A. Hathaway, Office of Chief of Engineers, Department of the Army, Washington, D. C.

Eugene L. Macdonald, Consulting Engineer, Parsons, Brinckerhoff, Hall and Macdonald, New York City.

Carl E. Beam, American Society of Civil Engineers, New York City, Co-Secretary.

A.G.C. Members:

Dwight W. Winkelman, President, D. W. Winkelman Co., Syracuse, N. Y., Co-Chairman.

George H. Atkinson, President, Guy F. Atkinson Co., San Francisco.

Lester C. Rogers, President, Bates and Rogers Construction Corp., Chicago.

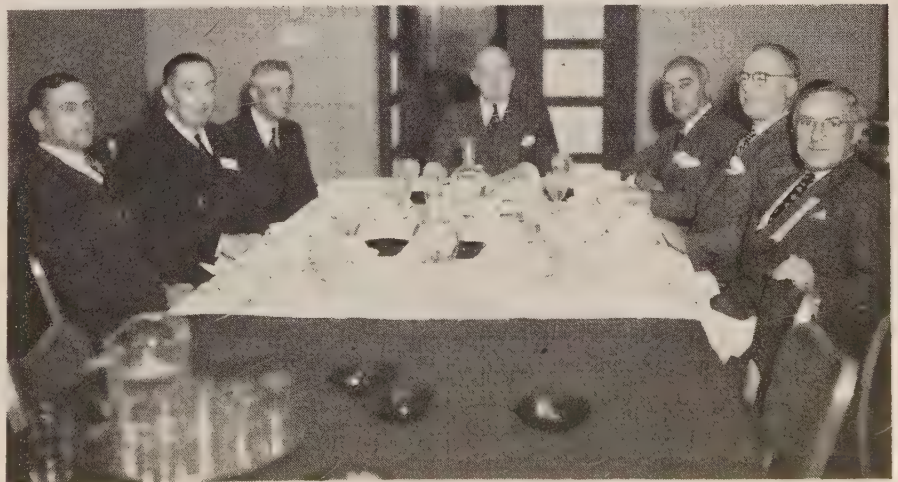
Archie N. Carter, Manager, Highway Contractors Division, The Associated General Contractors of America, Washington, D. C., Co-Secretary.

ganization and Mr. Carey and Mr. Foreman serve the committee in an ex officio capacity. Consideration is being given to increasing the size of the committee.

In its work the national committee has the benefit of the experience and thinking of engineers and contractors throughout the country, while at the same time it serves as a model for committees in local areas throughout the country.

Through the years the ASCE-A.G.C. Joint Cooperative Committee should become an increasingly important medium for the exchange of information and ideas on all matters of mutual interest to civil engineers and general contractors, and will develop recommendations which should prove of direct benefit to the members of both organizations, as well as the construction industry and the public.

DISCUSSING activities of the Joint Cooperative Committee at Washington, D. C., during the ASCE Fall Meeting are, left to right: ARCHIE N. CARTER and WALTER COUSE, representing A. G. C.; CARL E. BEAM and KIRBY SMITH, ASCE; DWIGHT W. WINKELMAN and JAMES D. MARSHALL, A. G. C., and GAIL A. HATHAWAY, ASCE.





45° Troughing Raises "Pay Load" 30%

From 20% to 30% increased carrying capacity was added to this conveyor belt—at no added cost. One of the world's largest pulp and paper mills needed to carry more wood chips to digesters. This had to be done without sacrificing belt life and dependable operation—for failure here stops a whole cycle of high speed operations.

Deep troughing would carry the increased load. So Pioneer engineers designed a belt with ply assembly that would stand troughing at 45° . . . and withstand this extreme flexing. The plies normally outlast covers—tough as the covers may be. So a longer-life cover was developed to fit the service.

Now well into its second year of operation, this 45° troughed, 36" wide belt, 725 feet long, has run day after day, almost around the clock, and shows no noticeable wear. A new addition to this plant, to be opened soon, will use large quantities of Pioneer belt—much of it deep-troughed, to get that 30% added capacity.

Do you have a belting or hose problem? Give your Pioneer Rubber Mills distributor a chance to help you solve it. His on-the-job know-how is supported by the research laboratories and manufacturing technicians of Pioneer Rubber Mills — the West's Industrial Rubber Goods leader since 1888.

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Construction at Idaho Atomic Plant

Work valued at more than \$35,000,000 will commence during 1950 for the nation's newest atomic energy installation—Western contractors are invited to participate

A CONTINUOUS and gradually expanding construction program is under way at the nation's newest atomic energy installation near Arco, Idaho. Since activation of the Idaho Operations Office on July 1, 1949, contracts totaling approximately \$4,600,000 have been awarded. It is expected that during 1950 work totaling from \$35,000,000 to \$50,000,000 will be commenced. In a number of cases, construction work has already started on access roads, water lines, excavations and utilities. About 400 construction men are to be employed on the project during the current season, and it is expected that about 2,000 construction workers will be on the job by the end of 1950.

Objectives of the Commission's reactor development program include development of nuclear reactors for: (1) the production of fissionable material, (2) the generation of electric power and (3) the propulsion of ships and aircraft. It is principally through the development of these atomic energy machines that the AEC expects in coming years to develop a means of utilizing for peaceful purposes the energy released by nuclear fission.

The program

The status of the work on the three reactors currently comprising the Commission's reactor development program in Idaho, is as follows:

1. **Experimental Breeder Reactor**—The nuclear design of this reactor has been completed by the Argonne National Laboratory at Chicago, Ill., and detailed architect-engineering design work is nearly completed. The architect-engineer for the reactor structure is the Austin Co. of Cleveland, Ohio. Installation of utilities, excavation work and construction of an access road is under way.

The Bechtel Corp. of San Francisco will build the steel, brick and concrete reactor structure, as well as the control, ventilation, cooling and other auxiliary equipment. Total cost of the reactor is expected to be about \$3,500,000. The work to be performed by the Bechtel Corp. will total \$2,500,000.

The experimental breeder reactor is designed to test the feasibility of breeding with fast neutrons and to investigate the application of liquid metals to the removal of fission-produced heat from reactors at high temperatures.

2. **Materials Testing Reactor**—The primary purpose of the materials testing reactor will be to test under conditions of severe neutron bombardment the materials which may be used in future reactor construction. On the basis of pres-



By **L. E. JOHNSTON**
Manager, Idaho Operations Office
U. S. Atomic Energy Commission
Idaho Falls, Idaho

ent estimates, it is expected that this reactor will cost about \$25,000,000.

The scientific design of this reactor has been developed in a cooperative effort by the Oak Ridge National Laboratory and the Argonne National Laboratory. A \$1,870,000 contract for detailed engineering design work on the reactor was signed last September with the Blaw-Knox Construction Co. of Pittsburgh, Pa. Design work is under way and construction is expected to begin by next spring. It is expected that a contractor will be selected for the cost-plus-a-fixed-fee portion of the work and that bids will be invited on the fixed price work for this particular project early in 1950.

3. **Ship Propulsion Reactor**—The ship propulsion reactor will be a single purpose machine designed specifically for the purpose of producing large amounts of heat under conditions that will permit conversion of power for propulsion of naval vessels. The Argonne National Laboratory and the Westinghouse Electric Corp. are engaged in the development of a land-based prototype. Research and development work is well advanced and detailed engineering design of this reactor is scheduled to begin in about a year. Construction should be under way by 1952. Although cost estimates cannot be made until detailed design specifications have been completed,

it is expected that the reactor will cost in excess of \$25,000,000.

The best site

A survey to determine the boundaries of acreage required for the Idaho Nuclear Reactor Testing Station is now being carried out with the assistance of the Bureau of Land Management and the U. S. Army Corps of Engineers. The AEC selected the 400,000-ac. Idaho location as the best site for the testing station last March after surveying more than 70 possible locations throughout the United States. All but about 12,000 ac. of the area is owned either by the Federal Government or the State of Idaho. On December 1, AEC accepted custody from the U. S. Navy of the Naval Proving Ground property near Arco, Idaho. This property includes 173,000 ac. of land, shops, storage facilities, barracks and certain utilities. The Naval Proving Ground property will serve as the nucleus of the Reactor Testing Station properties.

On July 1, 1949, the Idaho Operations Office of the AEC was officially opened with headquarters in Idaho Falls, Idaho. First problem facing the staff at this office was the developing of a master plan for the overall site. Very little engineering detail was available about the desert site. To plan intelligently a road system, railroad system, power system and common facilities (such as shops, warehouses, dispensary, and laboratories) a thorough knowledge is necessary of overburden and sub-surface conditions, of hydrology and geology, etc. Master planning is being done by the staff at the Idaho Operations Office, while the gathering of data and detail design is being "farmed out" to engineers, architect-engineering firms and other Governmental agencies.

Construction progress

For the first reactor, preliminary field work is completed and construction of site facilities is under way. Steel for the plant is being supplied by Judson-Pacific-Murphy Corp. of Emeryville, Calif., and erection is by Paramount Steel Corp. Morrison-Knudsen Co., Inc., Boise, Idaho, is constructing the access road from Highway 20 to the reactor site, and the same firm is doing the excavation for the reactor structure. The contract for installation of the primary water line has been awarded on a competitive fixed price basis to Intermountain Plumbing Co. of Boise, Idaho. For construction of the reactor structure and process work, the contract with Bechtel Corp. is a cost-plus-a-fixed-fee type, due to the complexity of the work and the changes and new developments expected during the course of construction.

The surveying of sites for the Materials Testing Reactor, the Ship Propulsion Reactor and a Chemical Separations Plant is now under way. Core drill crews are actively engaged in exploring the underlying lava and a test well,

drilled by Cope Drilling and Pump Co., indicates the availability of water at the MTR site. Bids for three production wells at this particular site have been invited. Excellent and completely adequate sources of aggregate have been located on the site and a concrete batch plant, moved from the Hanford plant, has been erected. Puget Sound-Macco of Seattle was the contractor on this job.

Selection of contractors

In general, the tempo of scheduling on the Reactor Testing Station project will not be like other atomic energy or military projects. The installation started off on a modest scale and is gradually picking up momentum, each job being scheduled to insure economy and efficiency of construction and operation. It is hoped that a continuous and gradually expanding program can be maintained, without peaks of high-cost and high-speed work.

Since the construction program is geared to the nuclear reactor development work going on in national AEC laboratories and in the drafting room and shops of contractors, schedules for the next 3 to 5 years will be reasonably firm. These schedules and the planned requirements of the reactor project will permit development of the site in an orderly manner. Much of the work during the remainder of this fiscal year, which ends July 1, 1950, will be on comparatively small jobs.

Contractors for standard work, such as roads, railroads, power lines, substations and conventional buildings, will be selected after advertising for competitive bids, or if this is not feasible, after solicitation of bids from as many qualified firms as circumstances permit. Awards will be made to the responsible bidders whose bids are most advantageous to the Government. The very complex and intricate work that is subject to changing development and design during the period of construction will not lend itself to competitive bidding. In such cases, cost-plus-a-fixed-fee type of contract will be used. It is believed that from $\frac{3}{3}$ to $\frac{3}{4}$ of the work can be accomplished on a competitive fixed price basis.

For help in carrying out contract operations, a Contract Board has been appointed, consisting of the Idaho Office Chief Engineer, Office Engineer, and Comptroller, with the Idaho Office Counsel as legal advisor to the Board. This Board studies each sub-project, carefully analyzes the work to be accomplished and determines the type of contract best suited to the particular job. If it is determined that fixed price contract is suitable, the Contract Board supervises the taking of bids and makes the necessary recommendations for the award to the successful bidder. If it is determined that a cost-plus-a-fixed-fee contract is necessary, the Board goes through a long and orderly process of reviewing the qualifications of various interested contractors and determining which of the contractors is best suited to do the job. Every contractor who has indicated an interest in the project is carefully considered.

To date, 21 contracts have been awarded out of the Idaho Operations Office. Nineteen of these contracts have been awarded to firms with headquarters in the West.

Some of the considerations that enter into the selection of a construction contractor on other than the competitive basis are:

- (1) Past experience and performance record.
- (2) Background of key personnel and personnel available for assignment to project work.
- (3) Volume of work in previous years.
- (4) Present commitments.
- (5) Experience in Mountain States Area.
- (6) Financial status.
- (7) Work to be performed by contractor's own forces.
- (8) Experience on complex installations.

It is felt that experience in the Moun-

tain States Area is one of the factors that would tend to allow a contractor to construct features of the Idaho plant more economically and efficiently. However, where firms from other regions are adequately equipped to perform the construction, it is considered just and fair to give them every opportunity to secure award of contracts.

In connection with procurement of services and supplies, the Idaho Operations Office is going to be heavily dependent on the general area of the Northwest. The Office is starting to build up lists of engineers, contractors, suppliers, shop operators, etc., but it is felt that present lists are far from complete. Letters from firms desiring to serve the project are welcomed so that the firms may be placed on the Office's mailing lists. Data should be sent to U. S. Atomic Energy Commission, Idaho Operations Office, P. O. Box 1221, Idaho Falls, Idaho.

Federal Loan Funds Available to States for Public Works Planning

ALLOTMENT by states from the initial \$25,000,000 appropriation for the new advance planning program has been announced by Jess Larson, Administrator of General Services. The amounts apportioned will be available as loans for the preparation of plans for state and local public works. A discretionary apportionment of \$5,592,529 is being reserved for emergency use in distressed areas where unemployment problems exist or impend.

Congress reinstituted the advance planning program with an authorization of \$100,000,000 for two years. An initial appropriation of \$8,000,000 in cash and \$17,000,000 in contract authority was provided in the second supplemental appropriation bill.

Among the purposes of the advance planning loans are:

1. To encourage state and other non-Federal public agencies to maintain a continuing and adequate reserve shelf of fully planned public works readily available when the economic situation may make construction desirable.
2. To attain maximum economy and efficiency in the planning and construction of public works. Projects for which planning loans are approved by GSA must conform to an over-all state, local, or regional plan.

The present reserve shelf of non-Federal public works has been estimated to be in the vicinity of \$2.5 billion. This is below the annual rate for non-Federal public construction which will run to \$3.7 billion in 1949 and more than \$4 billion in 1950.

The current appropriation will put an estimated \$750,000,000 in blueprinted projects on the reserve shelf.

GSA will make loans—repayable into the U. S. Treasury without interest when construction starts—to states, cities and counties; school, sanitary,

levee and drainage districts; townships and other political subdivisions. The loans would be made to aid in financing the cost of architectural, engineering, and economic investigations as well as studies, surveys, designs, plans, working drawings, specifications and other action preliminary to construction of public works. Housing is specifically excluded.

The first advance planning program, administered by the Federal Works Agency, whose functions have been absorbed by GSA, expired June 30, 1947, after loans had been approved for 6,790 public works projects to cost an estimated \$2,683,914,258.

Under a formula fixed by the Act, Public Law 352, 75 per cent of the apportionment to the states is based on population. An additional apportionment is provided to bring the minimum state allotment to $\frac{1}{2}$ of 1 per cent or not less than \$90,938. Loan apportionments to Western States follow:

	% of State Population to Total of All States	Apportion- ment
Arizona	0.372	\$ 90,938
California	5.152	937,020
Colorado	0.838	152,411
Idaho	0.392	90,938
Kansas	1.344	244,440
Montana	0.417	90,938
Nebraska	0.982	178,601
Nevada	0.082	90,938
New Mexico	0.397	90,938
North Dakota	0.479	90,938
Oklahoma	1.743	317,008
Oregon	0.813	147,864
South Dakota	0.480	90,938
Texas	4.786	870,454
Utah	0.411	90,938
Washington	1.295	235,528
Wyoming	0.187	90,938
Alaska	0.054	90,938
Hawaii	0.316	90,938

Portrait of a Western Power Expert

Leshar S. Wing, Western Regional Engineer for the FPC, is recognized as one of the nation's best informed men concerning power resources of the West

HOW WILL the Pacific Northwest solve its power shortage? Are California's water resources sufficient to allow for an expansion of its present economy? Does Arizona have enough water to maintain its economy at today's level?

These are typical of the questions crossing the desk of Leshar S. Wing, Regional Engineer for the San Francisco office of the Federal Power Commission, with jurisdiction over the states of Oregon, Washington, California, Nevada, Arizona, Idaho, Utah and Montana. And, fortunately, he is regarded as one of the nation's best informed men concerning Western power resources.

Leshar Stiles Wing was born in 1892, at Blue Earth, Minn., but his family soon moved to Arlington, S. Dak., where he attended grammar and high schools. Although he enjoyed an outdoor life of hunting and fishing, with summers spent on the family ranch in nearby Wyoming, the scenes of his childhood have little attraction today for Wing. In Arlington they have a saying, "If the wind doesn't blow, the sun doesn't shine." The combination of unceasing wind, winters that seemed to grow progressively colder and the lack of engineering opportunities was enough to dampen permanently his enthusiasm for the state.

Always an engineer

Wing, who took a drafting course when he was 12 and started working on mechanical inventions at 14, always knew he wanted to be an engineer but found it difficult deciding in which branch of engineering to specialize. At South Dakota State College, he started with mechanical design, discovered a growing interest in electrical engineering, and ended up by taking a combination of both courses, graduating in 1916 with the degrees of B.S. and M.E.

Following his graduation, he was selected as one of the students to be sent to Pittsburgh to take the Graduate Student Course offered by the Westinghouse Electric & Manufacturing Co. His memories of the Pennsylvania city are described as a picture of dirty gray slush that passed for snow, smoke-fogged days, and a first bath after arrival which left him dirtier than before he took it due to the soot that sifted into the tub.

Wing's first job, early in 1917, was work on the installation of 140,000-kv. switches for a hydroelectric project in Northern Michigan. The temperature was 20 to 40 deg. below zero, making it necessary to thaw the ground with fires before starting operations. He remained with the Consumers Power Co. of Jack-

son, Mich., until shortly before June, 1918, when he went on active duty in the Air Service Branch, Signal Corps, Army.

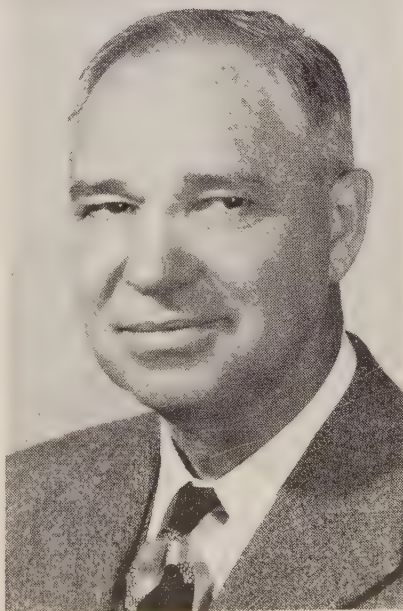
Following his discharge in December, 1918, Wing became Assistant Chief Engineer—"more title than pay"—with the Great Western Electric Chemical Co. at San Francisco, after which he worked on design for the American Smelting and Refining Co. at Tacoma, Wash.

In 1921, he laid the basis of his present career by joining the California Farm Bureau Federation. There were, at this time, literally hundreds of different rates for agricultural power in California. Consumers might have the option of three or four different rates—and were frequently finding themselves on the wrong one.

Wing represented the farmers in rate proceedings before the California Public Utilities Commission, handling electrical, gas and telephone disputes. By the time he left the Farm Bureau, he had learned much about both law and accounting, as it was necessary, in determining whether charges were properly made, to work out fair operating expenses and set the evaluation of property.

It was also necessary to deal tactfully with outraged farmers who felt that they were being grossly overcharged.

LESHER S. WING



One stifling summer day, Wing went out to check on the electrical rate at a certain rather prosperous farm. The bill for electricity did seem high, yet a thorough check of the property detected no apparent waste or power leaks. Finally Wing strolled out into the kitchen, where stood a shiny new electric refrigerator, door wide open.

He turned to the cook. "Did you know that the refrigerator door is open?" he asked.

"Oh, yes," she replied enthusiastically, "I keep it open all summer long. It cools the kitchen off, just beautiful!"

There was a lot of original work to be done with the Farm Bureau, and Wing enjoyed every bit of it. The field was not static, new ideas were needed and were constantly being supplied, and in the business of evaluation and rate-making, a continual battle of wits was in progress. Eventually, however, all agricultural power rates for the state were standardized and the diversity of rates was reduced to the bare minimum, until it became impossible for the consumer to get on the wrong rate. In addition, uniform extension rules were adopted.

Then, after 13 years, Wing found that the fascination of the job was beginning to wear a bit thin, probably, he admits, because rates had been reduced to such an extent that he saw little hope of any further cuts.

Investigates the West

It was at this time (1934) that Lester S. Ready, Chief Consulting Engineer for the National Power Survey, requested that Wing take charge of certain phases of this work on the Pacific Coast. As the result of this work, Wing later went to Washington, D. C., as Chief Engineer of the Survey Staff. His first job was to make an investigation of the power potential for all streams west of the Rockies. This job involved contacting numerous state and federal agencies, and all major electric utilities.

Wing's familiarity with power and irrigation problems, as well as his 19 years of association with electrical and gas utilities, made it possible for him to establish many procedures for objective report writing, now accepted and used by the staff of the Federal Power Commission. His Washington assignment terminated shortly after publication of the Survey's Interim report, considered the father of a first series of companion reports covering all phases of the electric-power business in the United States.

After a special assignment to the Pacific Coast for the Federal Power Commission, he was appointed Regional Director of the Commission for the Denver Office. Immediately upon his arrival, in October, 1936, Wing and his staff began intensive studies for the establishment of wholesale rates for power to be generated at the then nearly completed Bonneville Dam. In March, 1937, a report was issued which set forth the costs

Concluded on page 103

Construction Design Chart

CXV... Steel Beams Without Lateral Support

A BEAM deflects under applied loads resulting in compressive stresses being set up on one side of the neutral axis, and tensile stresses on the other side. The compression side of the beam, under certain conditions, acts as a column with a resulting buckling tendency. The steel handbooks and building codes have for many years specified a maximum allowable ratio of L/b for steel beams, and a corresponding reduction in allowable stress in accordance with that ratio. In 1945, the American Institute of Steel Construction proposed the use of a new method, or formula, for the determination of the allowable maximum stress in steel beams without lateral support. This new formula took into consideration not only the breadth of the beam, but in addition the beam depth and flange thickness. The

By
JAMES R. GRIFFITH
Dean of Engineering
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allowable stress is given, in this method, by the expression

$$f = \frac{12,000,000}{\frac{Ld}{bt}}$$

with a value of $f = 20,000$ p.s.i. as the maximum allowed. The accompanying chart has been designed for application of this new A.I.S.C. formula.

At first glance the chart appears to be rather complicated. In reality it is two

charts superimposed, having a common allowable stress scale. The two (A) scales must be used together, and the two (B) scales together. On examination, the reader will find that this chart answers many questions relative to beam design. Conforming to standard steel practice, only the depth and unit weight has been indicated for the various sections. Likewise, only the lightest weight beam of each group has been shown since these are the sections most commonly available. The experienced designer will, even then, work with a stock list before him.

In order to illustrate the use of the chart, I have drawn two solution lines assuming a 12-in., 40.81-lb. standard I-beam on a 16-ft. span. Solution line (1) has been drawn from the given section to the span, thereby indicating an allowable unit stress of 18,100 p.s.i. Solution line (2) has been drawn through this allowable stress, to the given section on the (B) scale. An allowable bending moment of 67.2 kip ft. is indicated.

As a check on the above values obtained from the chart, the following computations are made. The A.I.S.C. Steel Construction Manual gives, for a 12-in., 40.8-lb. I-beam, the following values:

Section modulus, $S = 44.8$ in.³

$\frac{d}{bt} = 3.47$ (page 190 of 1947 edition)

The allowable unit maximum stress is then

$$f = \frac{12,000,000}{\frac{Ld}{bt}} = \frac{12,000,000}{16 \times 12 \times 3.47} = 18,017 \text{ p.s.i.}$$

and the allowable bending moment is

$$M = Sf = 44.8 \times 18,017 = 807,161 \text{ in. lb.} = 67.26 \text{ kip ft.}$$

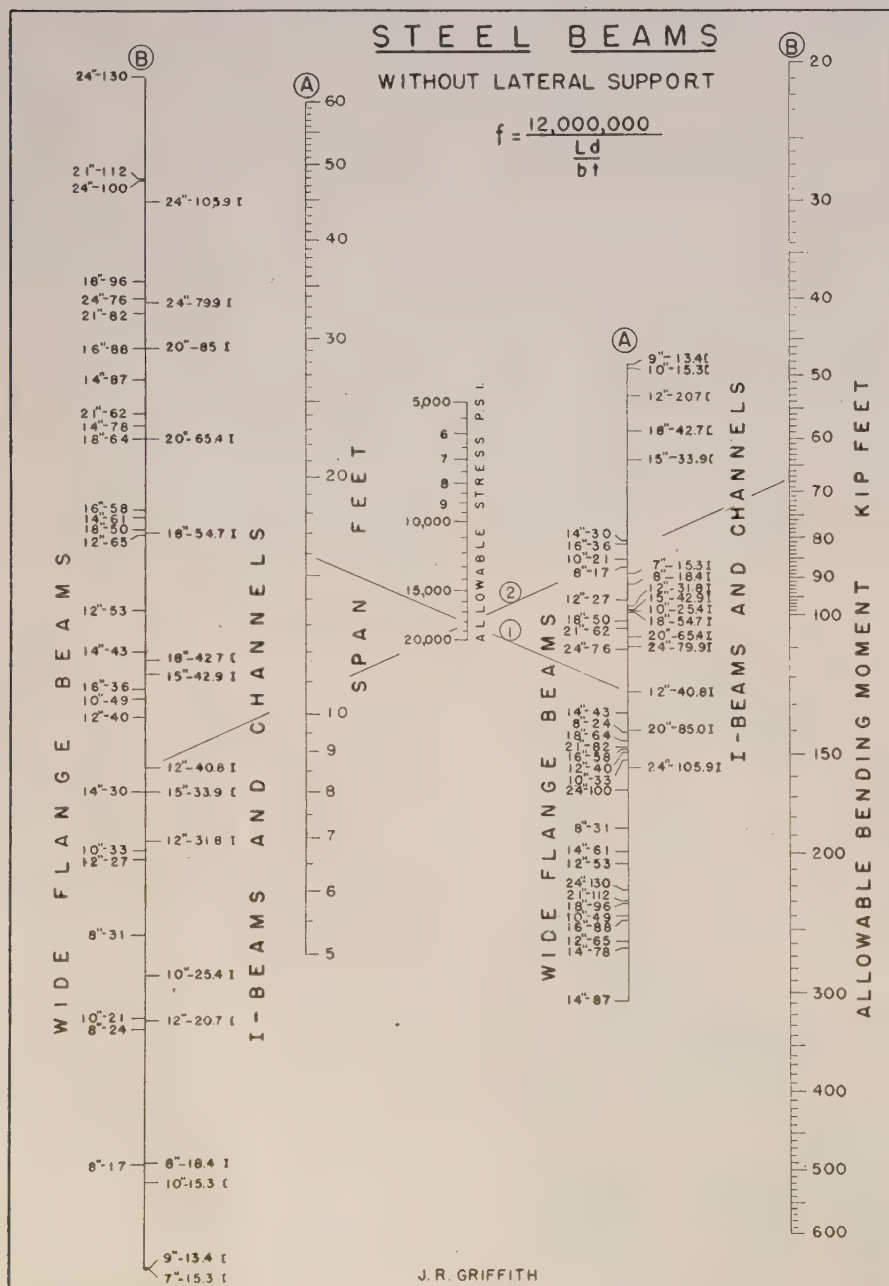
When the solution line indicates a higher value than the 20,000-p.s.i. maximum, the second solution line should then be drawn using the 20,000 value. The designer will usually want his allowable stress close to the maximum. He can quickly tell from the chart which sections, for the given span, will permit the maximum allowable stress.

As an example, let us assume that it is desired to select an economical section for an 18-ft. span with a bending moment of 120 kip ft., including all loads except the dead-load of the beam itself. If a solution line for an 18-ft. span at a unit stress of 20,000 p.s.i., the allowable sections for the

$\frac{Ld}{bt}$ conditions will be obvious. Then a

second solution line, if drawn from the given bending moment through the allowable stress, will indicate the permissible sections for stress. While I have not drawn these solution lines, the reader will find that for the assumed conditions a 12-in., 53-lb. wide flange beam is the most economical section. The dead-load moment can be determined as being about 2 kip ft. from the chart on page 178 of the reprint.¹ This value is so small that the selected section will be entirely adequate for the total moment.

¹Construction Design Charts, 1947 edition, Western Construction News.



NEWS OF WESTERN CONSTRUCTION

JANUARY 15, 1950



Reorganization of Idaho's Highway Department Urged

COMPLETE reorganization of the Idaho State Highway Department to provide more centralized authority and responsibility under a Commission of Highways has been recommended by consultants of the Public Administration Service.

In an extensive report released by Governor C. A. Robins, chairman of the Idaho Highway Study Committee authorized by the last session of the Legislature, the committee is urged to recommend a program that would:

—Create a 6-man, appointive, highway advisory board, to serve without salary, for staggered terms of 6 years each.

—Centralize engineering, planning, construction and general authority in

the Commissioner of Highways and reduce authority of district offices.

—Place department employees under a merit system.

—Increase passenger vehicle license fees to \$10, adding an estimated \$785,000 annual revenue, and property-carrying vehicle fees to add \$1,300,000 annually, or a total of approximately \$2,000,000 a year.

—Undertake an improvement program of approximately \$150,000,000 over a 12-year period, but only if the recommended organizational changes are made.

—Enforce regulation of load limits and vehicle sizes, now violated by about one vehicle in 50 according to studies,

which indicated that excess loads included such items as "oil, cement, eggs, milk, gasoline, and candy, as well as forest and mine products."

—Dissolve highway districts and turn this work over to counties except where districts are wholly within municipalities, in which case cities should take over.

—Place county road activities under county road superintendent.

Two Plans Proposed for Puget Sound Crossing

CHARLES E. ANDREW, consulting engineer for the Washington Toll Bridge Authority has advocated the construction of either an underwater tube or floating bridge across Puget Sound to replace present ferry systems. His first proposal is a tube from Alki Point in Seattle to Restoration Point on Bainbridge Island. He estimates the cost of this, along with necessary approaches and a floating span to reach the mainland of Kitsap County, north of Marnette, at from sixty to sixty-five million dollars.

A second possible crossing of the Sound could be achieved, Andrew believes, by construction of a floating bridge from Brace Point, near the south city limits of Seattle, to Dolphin Point on Vashon Island, with a suspension bridge across Colvos passage to the Kitsap County shore. This route, with approaches is estimated to cost around \$50,000,000.

CONSTRUCTION ADVANCING ON HUGE CALIFORNIA PUMPING PLANT

THE PUMPING plant being built by the Bureau of Reclamation near Tracy, Calif., to lift 4,600 sec. ft. of water from the San Joaquin River 200 ft. into the Delta-Mendota Canal, with the plant building at left, temporary construction trestle and gantry, and four of the six concrete-encased steel discharge pipes leading to the right.



Denver Asks FPC to Approve Boulder Creek Power Project

THE FEDERAL Power Commission has been asked to authorize issuance of a license to the City and County of Denver, Colo., for the construction and operation of a hydroelectric project on South Boulder Creek in Boulder County.

The project would include a dam and reservoir with an initial capacity of 42,000 ac. ft. and an ultimate capacity of 113,000 ac. ft.; a closed conduit 18,500 ft. long; a powerhouse with an installed capacity of 10,500 hp. and a generating capacity of 7,875 kw.; and a 2¾-mi. transmission line leading from the powerhouse to a transmission line of the



THREE TRACTORS PULL PLOW FOR LAYING CABLE IN NORTHWEST

FOR LAYING of wrist-size telephone cable from Seattle to Yakima in Washington, three Allis-Chalmers HD-19 tractors pull a plow share, often through mud. The plow share opens a 5-ft. slot in the ground, a cable reel is attached to the plow train and the cable is then buried in the slot. The tractors often set their brakes and use winch lines to pull the plow ahead. The work is part of a \$4-million Pac. Tel. & Tel. project.

Public Service Co. of Colorado, which in turn carries electric energy to Denver.

The application says the project is primarily designed to supply water to Denver and the generation of electric energy is purely incidental and for the purpose of helping defray the cost. Although the immediate use for the power to be generated at the project is to supply Public Service Co., the application says that the Board of Water Commissioners hopes ultimately to develop sufficient electric generating resources and transmission facilities to supply itself with all electricity needed for water works purposes.

HYATT RETIRES

EDWARD HYATT, State Engineer of California for the last 22 years and Chief of the Division of Water Resources, is retiring February 1st on his doctor's advice. For the last quarter century, he has been a leader in the development of California water resources and particularly the Central Valley Project. A. D. EDMONSTON, Assistant State Engineer since 1945, is succeeding Hyatt. A resume of Hyatt's professional career will appear in the next issue of *Western Construction News*.

Construction Materials Flown Into Remote Site

A NEW USE for the airplane as a tool in the construction industry was demonstrated recently by Johnson Flying Service, Inc., of Missoula, Mont., when it dropped parts for a forest service bridge and a complete sawmill in an isolated mountain area of Idaho, about 70 mi. southwest of Missoula. The peaks in this country tower about 10,000 ft. above sea level while the bottoms of the narrow gorges cut through them average between 2,000 and 3,000 ft. above sea level.

The bridge was being built by the Forest Service across a tributary of the Lochsa River, and all metal rods, connectors, etc., necessary to secure a log bridge were flown in. The total weight of material dropped for the bridge was approximately 10,000 lb. It was dropped in two loads from a Douglas C47. Each piece was supported by one or two parachutes and dropped from an altitude of about 400 ft. above the surface. An open space about 300 ft. in diameter was available near the bridge and served as a landing area.

A few days after the bridge items were dropped, a portable sawmill, including engine, saw, tracks, etc., was dropped at the same point to use in sawing up the logs to be used in the bridge. The sawmill was dropped in two loads, one

weighing approximately 5,500 lb., the other about 2,500 lb. The engine, crated, weighed about 650 lb., and was dropped with three parachutes. One of these failed to open, but the weight was carried successfully by the other two.

The Johnson Flying Service was organized in 1924 and is one of the oldest and largest aviation organizations in the Northwest. It has had a great deal of experience in mountain flying, fire fighting and similar hazardous occupations. The use of their equipment in flying construction materials will be of wide interest to the building industry.

Aluminum Co. of Canada Plans Big Development

EXPANSION WORK of the Aluminum Company of Canada in central British Columbia is regarded as the key to the development of a new industrial empire in this comparatively thinly settled section of Canada's most western province. Highlight of the investment is the search for dam sites to permit the development of 1,500,000 hp. of electrical energy to be used in aluminum manufacture. This hydroelectric project will involve creation of a 600-sq. mi. reservoir and the reversal of the flow of an entire chain of lakes and rivers.

The project is expected to result in the creation of an entirely new city on B. C.'s coast, with a population of about 50,000. At the present time engineers of the company are probing the site of a proposed 200-ft. dam on the Nechako River. So far no satisfactory sites have been located. Two sites are now being surveyed at Nechako Canyon and Echu Lake.

Even if all initial problems are worked out satisfactorily it will be years before any final developments begin to take form. McNeely Dubose, vice-president of Alcan, who recently flew over the area, said that no definite decision on the choice of a location will be made for at least a year. After that, it probably will be a decade before there are any "spectacular developments." It may be 10 to 20 years before production of aluminum begins.

While the Nechako dam site will be the eastern key to the project, the western feature will be a 10-mi. tunnel to carry water from Tahtsa Lake to the Kemano River 2,400 ft. lower, near tide-water. Here lies a potential 1,500,000 hp. of electrical energy.

To provide a backlog of water, the Nechako dam would raise the level of Naalkuz Lake 171 ft., Ootsa Lake 140 ft., Whitesail Lake 121 ft., and Tahtsa Lake 32 ft. On the south fork of the circuitous chain of lakes, Echu Lake would be raised 169 ft. and Tetachuck Lake 20 ft. Eutsuk Lake, one of the largest in the chain would remain at its present level if the Nechako dam is constructed.

Professor Karl Terzaghi, geologist and expert on soil mechanics from Harvard University, who has been retained as a consultant on foundation exploratory work, says that the development of the site being investigated would create the longest hydro reservoir in the world.

Route of Delta-Cross Channel Is Determined

THE ROUTE of the Delta Cross-Channel, key mid-state link of California's Central Valley Project system of facilities to transfer Shasta reservoir waters to the San Joaquin Valley, has been determined, Regional Engineer W. J. McCrystle of the Bureau of Reclamation announces. The determination climaxes years of study by the Bureau and the State Division of Water Resources as to the most practical and efficient use of the natural channels of the Delta in moving the waters of the project.

A leveed cut, 19 ft. deep by 325 ft. wide, and 4,200 ft. long, will be excavated from the Sacramento River to Snodgrass Slough at Walnut Grove. Beyond the cut the water will flow through Snodgrass Slough and the Mokelumne River, a distance of about 15 mi., to the San Joaquin River, thence through Middle River and Old River, and via the $2\frac{2}{3}$ -mi. Intake Canal to the Tracy Pumping Plant to be lifted 200 ft. into the Delta-Mendota Canal.

The cut at Walnut Grove, supplemented by some dredging of the natural channels, is expected to permit the present diversion by gravity to be increased to a total of 6,000 cu. ft. per sec. That quantity is estimated to be sufficient to (1) deliver the water required at Tracy Pumping Plant to pump into the Delta-Mendota Canal for transfer to the San Joaquin Valley during the

first years of operation, (2) provide sufficient flow to repel salt water intrusion from San Francisco Bay, and (3) take care of all consumptive uses in the area. As future water requirements increase, it probably will be necessary to divert additional Sacramento River water at Isleton into the Delta Cross-Channel.

McCrystle said that final test borings and surveys are nearing completion, and drawings are being prepared in the office of the Chief Engineer at Denver for the three structures to be built at the Walnut Grove intake—a highway bridge, a railroad bridge, and a flood gate structure. Construction is expected to begin in 1950, for completion along with other water-transfer structures in time for integrated project operation in July, 1951.

FPC Ruling on Kings River Power Project Challenged

THE SECRETARY of the Interior has filed an application for rehearing on the Federal Power Commission's order of Nov. 10, 1949, which authorized issuance of a 50-year license to Pacific Gas and Electric Co. for a hydroelectric development in the Kings River Basin of California, and a preliminary permit to Fresno Irrigation District for investigation of the proposed development of a power plant at the Pine Flat Dam on the North Fork of the Kings River.

The application for rehearing alleges that the Commission erred in 53 particu-

lars in its orders in the proceedings, which included authorization of the issuance of an amendment of PG&E's license for its existing Balch plant on the North Fork of the Kings River.

The Bureau of Reclamation has opposed the PG&E and Fresno District applications on the grounds that the Bureau plans its own development of the Central Valley of California, including the Kings River projects.

Conferences Scheduled Next Month on Road Construction

THREE IMPORTANT conferences on road building have been announced for next month. The third annual meeting sponsored jointly by the Civil Engineering Department of the University of Washington and the student chapter of the American Road Builders Association will be held in More Hall of the University campus, Feb. 6-8.

The second conference on roads and streets will be held at Corvallis, Ore., Feb. 23 and 24, by the Department of Civil Engineering at Oregon State College and the student chapter of the American Society of Civil Engineers at the college.

At the University of California at Los Angeles, the Institute of Transportation and Traffic will hold its second annual conference on street and highway problems from Jan. 30 to Feb. 1. R. M. Gillis, Assistant California State Highway Engineer, heads the planning committee.

NEW...Rocker Dump Attachment on GAR-BRO concrete carts



Rocker can be furnished as a separate item for attaching to any GAR-BRO Concrete Cart.



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IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise
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GAR-BRO

USBR Bid Invitations Expected Before Spring

ACCORDING TO an announcement from the office of the Chief Engineer of the Bureau of Reclamation in Denver, Colo., that agency expects to issue invitations to bid on construction of numerous projects during the next several months.

During January, it is anticipated that advertisements will be issued on construction of Missouri Diversion Dam, on the Missouri River near Fort Peck, Mont., a concrete spillway gate structure 650 ft. long and 30 ft. high; Fort Sumner Diversion Dam, on the Pecos River near Fort Sumner, N. Mex., concrete gravity, 700 ft. long and 40 ft. high; 3 mi. of concrete pipe laterals near Lindsay, Calif.; 38 mi. of 115-kv. transmission line between Jamestown and Edgeley, N. Dak., and 70 mi. of 69-kv. transmission line between Edgeley and Forman, N. Dak.; and stringing of overhead ground wires on 120 mi. of the Phoenix-Tucson transmission line in Arizona.

In February, invitations to bid are to be issued on even more projects, among them: Keyhole Dam on the Belle Fourche River, 15 mi. northeast of Moorcroft, Wyo., an earthfill structure 120 ft. high and 3,420 ft. long; Carter Lake Dam, 8 mi. west of Berthoud, Colo., earthfill, 180 ft. high, and with 3 additional earth dikes; North Poudre Supply Canal Tunnels, 4 in number, totaling 2.8 mi. in length, near Fort Collins,

Colo.; 30 mi. of Mohawk Canal near Wellton, Ariz., and 13 mi. of protective dikes; 10 mi. of the Goleta section of concrete pipe conduit near Santa Barbara, Calif.; 9 mi. of unlined Superior Canal, near Superior, Neb.; another 69 mi. of concrete pipe distribution line near Lindsay, Calif.; the 8-mi. long Newman Wasteway on the Delta-Mendota Canal, near Newman, Calif.; relocation of a county road at Keyhole damsite near Gillette, Wyo.; and relocation of 33½ mi. of single track railroad at Boysen damsite, 21 mi. south of Thermopolis, Wyo.

Another imposing group of contracts is to be offered by the Bureau during March. Among them will be: Cachuma Dam on the Santa Ynez River, about 25 mi. from Santa Barbara, Calif., an earthfill structure 216 ft. high and 2,900 ft. long; Tiber Dam on the Marias River, 13 mi. south of Chester, Mont., earthfill, 200 ft. high and 4,250 ft. long; Big Sandy Dam on Big Sandy Creek near Eden, Wyo., earthfill, 70 ft. high and 2,300 ft. long; Willow Creek Dam on the stream of that name, near Granby, Colo., earth and rock fill, 140 ft. high; terminal reservoir for the Salt Lake Aqueduct, 40,000,000-gal. capacity, cut and fill type; 81 mi. of concrete pipe distribution laterals near Delano, Calif.; 30 mi. of unlined section of the Cambridge Canal, near Arapahoe, Neb.; enlargement of 6.6 mi. of Fire Mountain Canal near Paonia, Colo.; and relocation of 19 mi. of single track railroad at Trenton damsite, near Trenton, Neb.

Electrical facilities to be constructed in February and March include: 42 mi. of 115-kv. transmission line between Kremmling and Oak Creek, Colo.; 88 mi. of 115-kv. line between Sterling, Colo., and Ogallala, Nebr.; 55 mi. of 115-kv. line from Alliance to Chadron, Neb.; 52 mi. of 115-kv. line between Carrington and Jamestown, N. Dak., and another 50 mi. of the same line from Carrington to Devils Lake, N. Dak.; 56 mi. of 115-kv. transmission line between Voltaire and Rugby, N. Dak., and another 61 mi. of similar line from Rugby to Devils Lake, N. Dak.; 42 mi. of 69-kv. transmission line from Bismarck to Almont, N. Dak.; 100 mi. of 115-kv. transmission line from Boysen Dam to Casper, Wyo.; 34 mi. of similar line between Seminole and Sinclair, Wyo.; Havre substation, 30,000-kva. capacity, near Havre, Mont.; and Sidney substation, 20,000-kva. capacity, near Sidney, Neb.

Work now slated for advertisement in March on electric facilities includes: 72 mi. of 115-kv. transmission line between Brighton and Brush, Colo.; 21 mi. of 34.5-kv. power supply line near Yuma, Ariz.; 17 mi. of 69-kv. transmission line between Tracy and Antioch, Calif.; stringing conductor on 280 mi. of 230-kv. transmission line between Davis Dam, Nev., and Coolidge, Ariz.; Tucson substation, 45,000-kva. capacity, at Tucson, Ariz.; Prescott substation, 30,000-kva. capacity, at Prescott, Ariz.; and 21 pumping plants along the Heart River near Glen Ullin, N. Dak.





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bility and maneuverability enable it to deliver the consistently high output they need. Proper weight distribution, smooth walking mechanism and easy control all contribute to outstanding production records wherever this versatile walker goes to work. Boom lengths on larger machines up to 250 feet; bucket capacities to 25 cubic yards.



SOUTH MILWAUKEE, WISCONSIN

PERSONALLY SPEAKING

John S. Longwell, Chief Engineer and General Manager of the East Bay Municipal Utility District at Oakland, Calif., retired December 31 after more than 25 years of outstanding public service with the utility district. He has been administrative head of the district for the past 15 years.

R. B. "Dick" Ward, who has been in charge of construction of the Horsetooth Reservoir near Fort Collins, Colo., for the Bureau of Reclamation, has been transferred to Laredo, Texas, where he will be in charge of construction of the \$46,000,000 Falcon Dam on the Rio Grande for the International Boundary Commission.

W. H. Wood, City Engineer of Banning, Calif., from 1932 to 1941 and continuously since 1941, retired Jan. 1. He has been succeeded by **Don C. Davis**, a member of the Los Angeles concern of Quinton Engineers, Ltd. Davis has 25 years of experience in the engineering departments of various California cities.

Lt. Col. Walter P. Leber has been assigned as Executive Officer to the Walla Walla District, Corps of Engineers in Washington. Lt. Col. Leber comes to Walla Walla from the Seattle District, where he has been stationed since Sept., 1949, as special assistant to the District Engineer, working on Chief Joseph Dam.

G. Donald Kennedy has been named to the position of Consulting Engineer and Assistant to the President of the Portland Cement Association, Chicago. Kennedy is former President of the American Association of State Highway Officials and has wide and varied experience in the fields of structural, municipal and highway engineering.

A major reorganization of the Water System divisions of the Los Angeles Department of Water and Power became effective recently. One of the principal changes involves the consolidation of the Water Construction division with the Field Engineering division. All functions of the former division will be under the direction of **R. R. Proctor**. **Samuel B. Nelson**, formerly with the Water Construction division, was named head of the Aqueduct division, and **John G. Cowan** took on the duties of Southern District engineer. The Water Electrical division has been abolished, its employees and activities now coming under the Mechanical Engineering division, headed by **S. M. Dunn**. **Norman M. Imbertson**, supervising engineer of construction since 1935, was named to the position of senior water works engineer in charge of the Construction and Inspection division. Imbertson will also act for Proctor during the latter's absence.

Sterling S. Green, who has headed the Water Engineering Laboratories section since 1934, was appointed to the position of senior water works engineer and will head the Design and Laboratory section.

In preparation for the operational phase of the Central Valley Project in California, Regional Director **Richard L. Boke** of the Bureau of Reclamation has announced creation of a new position—that of Project Superintendent, who will become the directing head of all CVP operations. Boke has named **Martin H. Blote** to the position of Acting Superintendent of the Central Valley Project. Blote, with some 30 years of experience in water matters concerning the Sacramento and San Joaquin Valleys, joined the Bureau staff in 1944, when the regional organization was set up, and has headed the Irrigation Operations Division since then.

Lenuel F. Wylie has been named construction engineer for the Bureau of Reclamation's San Luis Valley Project in Colorado. Transferred from the San Luis project in 1947 for service in the Amarillo, Texas, regional office of the Bureau in the branch of Design and Construction, he returns to supervise construction of Platoro Dam on the Conejos River, major feature of the project. He succeeds the late **Ernest Puckett**.

James F. Spofford, Irrigation Manager for the Bureau of Reclamation's Owyhee Project in Idaho and Oregon, has been promoted to Superintendent of the Minidoka Project in Southeastern Idaho. He replaces **John S. Moore**, who retired.

Michael J. Callaghan, civil engineer in the office of the City Engineer of San Francisco, has retired after 36 years of service with the city.

Three engineers have been named to handle public works planning in Colorado, New Mexico and Wyoming under the new Federal law designed to encourage states and other public agencies to maintain a continuing reserve of fully planned public works. **Charles M. Leedy** of Denver was designated to handle the program in Colorado and Wyoming; **H. C. Jensen** was named for Utah, and **C. A. Branum** was named to handle the program in New Mexico.

Major Louis L. DeNoya has been assigned as Executive Officer of the Tulsa District Office, Corps of Engineers. He replaces **Lt. Col. H. F. Dyer**, who has been assigned to the American Military Mission for Aid to Turkey. The Major was assigned to the Tulsa District in July of 1948, with field duty at the Hulah Dam, now under construction.

S. A. Ward, assistant general manager of the Salt River Valley Water Users Association, Phoenix, Ariz., for the last year, has been named manager of the Salt River Power District. The appointment was merely made formal since Ward had been carrying out duties of the new post from the time when all power operations of the Association were transferred to the district recently.

Col. Charles H. McNutt has succeeded **Lt. Col. Joseph O. Killian** as District Engineer for the Army Corp of Engineers, Albuquerque District. Col. McNutt comes from his most recent assignment as commanding officer of the 7th Engineer Brigade at Camp Gordon, Va.

Horace V. Hubbell, Bureau of Reclamation project engineer for Angostura Dam of the Missouri River Basin Project, retired recently after more than 36 years of service with the Bureau. Beginning as assistant engineer on the Belle Fourche Project in South Dakota in 1928, he was successively—associate engineer on the Boulder Canyon Project, Nev. (1932); field engineer on the Salt Lake Basin Project (1933); construction engineer for the Fresno Dam on the Milk River Project near Havre, Mont. (1937); construction engineer for the Rapid Valley Project in South Dakota (1940), and construction engineer on Angostura Dam on the Cheyenne River near Hot Springs, S. D.

Oden Proctor has been named as new city manager of Monticello, Utah. Launching of municipal construction necessitated creation of the office.

Roy W. Morse, formerly an engineer with the Boeing Airplane Co., has been appointed as superintendent of the Seattle, Wash., water department. He thus occupies the position held by his father, the late **W. Chester Morse**, for many years. Morse will also be a member of the Seattle Board of Public Works.

H. H. Kuphal has been appointed district highway maintenance engineer at Missoula, Mont., for the Montana State Highway Department. He replaces **H. C. Tilzey**, retired.

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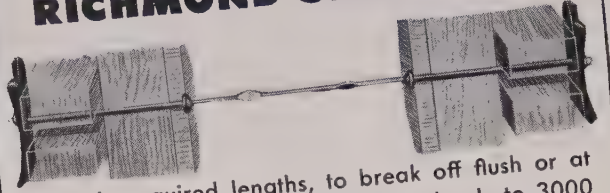
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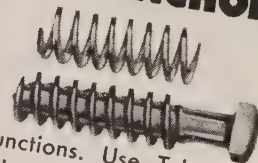
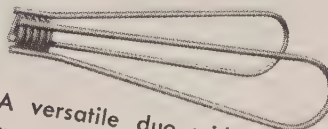
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SUPERVISING THE JOBS

B. "Woody" Williams is the project manager and George Piedmont is the general superintendent for Morrison-Knudsen Co., Inc., on construction of the \$10,000,000 Kortes Dam 60 mi. southwest of Casper, Wyo., a Bureau of Reclamation project. F. C. Eberhardt is chief engineer for the contractor. Bob Test is the master mechanic. H. P. O'Hagan is carpenter superintendent. Concrete foremen include Nick Piedmont, Fred Knifer and Carl Pavilek. Early Regan is rigger boss and Bill Haggerty is chief electrician. Duane Williams is in charge of the mixer plant. Joe Ray is pipe foreman and Willis McGill is steel foreman. Cliff Greer is boiler maker foreman.

"Spec" Willis is the superintendent for Peter Kiewit Sons' Co. on grading and oil surfacing a 6-mi. section of new highway about 14 mi. south of Jackson, Wyo. Gail George and Mac Welling are grading foremen; Tom Crable and Bill Frazer are shovel foremen; George Burris is powderman; Don Berg is concrete foreman; Stan Woinoski is master

mechanic, and Al Kaul is job office manager.

The Oro Loma Sewage Disposal Plant, a \$739,500 project at San Lorenzo, Calif., is being built by Franceschi Construction Co., San Francisco, under the direction of Alfred Winter and his staff of inspectors—Frank J. Summeril, Jess W. Ginn, L. A. Van Etten and John Winter. Vestel E. Harris is superintendent of the construction; Joseph G. Lombardi is assistant superintendent; Conrad J. Haas is job office manager; Lester A. Smith is labor foreman; Fred Jensen is general carpenter foreman; James Cienfuegos is steel superintendent; Neil F. Kelly is plumbing superintendent; George Foster is cement finisher foreman; Flay Deaton is chief equipment operator; R. A. Keating is millwright foreman, and Joe Ruebel is pile butt foreman.

On production of sand and gravel under a subcontract to Peter Kiewit Sons' Co. on construction of the Friant-Kern Canal near Porterville, Calif.,

Baker-Mitchell-Twinning Co. of San Bernardino, Calif., have George Twinning, Jr., as project manager and Fred Harris as superintendent. Roy Bagley is foreman.

Axel Hallberg is general superintendent for MacDonald, Young & Nelson, Inc., San Francisco, on construction of a warehouse and miscellaneous buildings for Lucky Stores at San Leandro, Calif. Paul Beach is superintendent. Bryant Sterling is carpenter superintendent, and Leon Kirschner and Robert Griffin are carpenter foremen. Walter Richter is concrete foreman and Jesse Hardin is labor foreman. Oliver Twigg is timekeeper.

The addition to the Fairmont Alameda County Hospital, a \$1,398,000 project, is nearing completion at San Leandro, Calif., under the supervision of Cloyd L. St. Clair assisted by Donald D. Pinnell, assistant superintendent, and Ole Bratset, general foreman. William A. Jent is carpenter foreman, Marvin Dillashaw is cement finisher foreman, and Emmet G. Smith is labor foreman. Swinerton & Walberg Co. are the general contractors. Plumbing installation is by Monterey County Plumbing Co., with Percy Foster in charge. Excavation and grading is being done by Close Building Material, with Harry O'Brien in charge. Clifford Electric is doing the electrical work under the direction of Edward Marquardt.

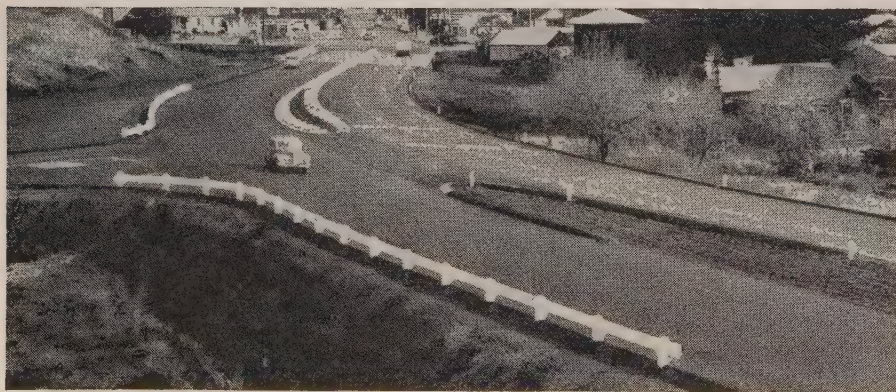
Robert Brock is superintendent for A. Teichert & Sons, Sacramento, Calif., on a state highway job near Half Moon Bay, Calif. Paul Shaw is assistant superintendent and Vern Hallberg is plant superintendent. Wayne Selby is master mechanic, Russ Stapleton is excavation foreman and D. L. Gibbons is labor foreman. W. A. Peckham is job office manager.

Superintending construction of the High St. Overpass on the Eastshore Freeway in Oakland, Calif., for A. Sodas & Sons are Vic Colburn and Ernest Johnson.

On grading and realignment of the Echo Lake Road near Idaho Springs, Colo., V. L. Christiansen is the superintendent for Burks & Co. of Evergreen, Colo. Foremen on the \$410,000 project are Johnny Gaughn, Fred Richards and Bob Soule. The job is at an elevation of over 10,000 ft.

E. H. "Whitey" Abbott is the superintendent for Colorado Constructors Inc., on street improvements for the city of Denver, Colo. R. G. Plummer is the grading superintendent.

C. J. Baustad is the job superintendent for the joint-venture firm of M & K Corp., Fredrickson Watson Co. and Piombo Construction Co. on construction of the \$10,000,000 prison building at Soledad, Calif. Orvil Gibson is the as-



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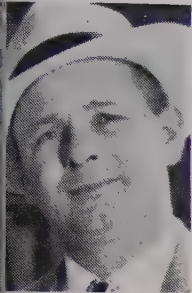
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GEORGE ERNO, left, is general superintendent for Stanton-Reed Co., Los Angeles, on construction of the new Psychopathic Unit building at the Los Angeles County Hospital. **Ed Enstrom** is assistant superintendent.

assistant superintendent. Granite Construction Co. of Watsonville, Calif., is doing the steel, grading and concrete work, with **Bell** and **Art Ostrom** as foremen.

Dan Morrison is the project manager for Guy F. Atkinson Co., South San Francisco, on construction of Route 99 north of Tulare, Calif. Morrison is also directing two other projects for the firm on Route 99 near Livingston and Berenda. Foremen on the Tulare job are **Al Morgan** and **Dave Christian**. **Norman Sinclair** is the job office manager.

Al. J. Vercruyssen is superintendent and **George Dupree** is foreman for Louis Biasotti & Sons on a state highway project near Livermore, Calif.

Charley Berglund is the general superintendent for Stanley H. Koller, contractor of Crockett, Calif., on construction of the sewage pumping plant and grit chambers at Oakland, Calif., for the East Bay Municipal Utility District. **Abe Bargaeha** is concrete superintendent and **Carl Brosamer** is plant equipment superintendent. **George Bell** is construction engineer, **Owen W. Haskell** is job office manager and **C. G. Page** is job accountant.

W. T. Stone is supervising a \$300,000 road improvement job at Echo Lake near Colorado Springs, Colo., for Wyoming Construction Co. **George Neal** is master mechanic on the job. Foremen include **Walt Quisenberry**, **Charles Stultz**, **W. S. Taylor** and **A. W. Winters**.

On construction of access road to the Pole Hill and Olympus tunnel 18 mi. west of Loveland, Colo., part of the Colorado-Big Thompson Project, **Pete Wolken** is the general superintendent for contractor **Fred DeBetz**. **Curly Vaughn** is concrete foreman on the \$350,000 contract, and **Sandy Naylor** is labor foreman. **Ed Turman** is the master mechanic.

On the new \$2,100,000 contract for construction of Unit 7, Coachella District System of the All-American Canal near Coachella, Calif., **R. V. Lloyd & Co.** has **B. D. Rogers** as superintendent. **J. Broesma** is job office manager and **Fred Todd** is job engineer. **Denver Criner** is master mechanic and **Leslie Still** is carpenter foreman. **J. C. Sams** is labor foreman. Peerless Concrete Pipe Co. is sub-contracting for small lateral

construction, and has **Oscar Corning** as superintendent and **Roland Drinkgern** as office manager.

George H. Wells is the project manager for Morrison-Knudsen Co., Inc., Seattle, Wash., on the \$1,691,666 contract for river channel improvements on the Columbia River below Grand Coulee Dam in Washington. **Ralph S. Smith** is the job office manager. Work has just started on the contract.

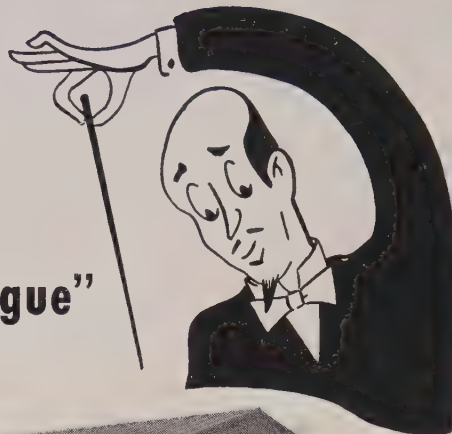
Floyd S. Garrett is supervising the \$1,599,931 construction of a new state highway department office building at Salem, Ore., for Sound Construction and Engineering Co., Seattle, Wash.

Joseph F. Miller is assistant superintendent. **Harry F. Simmonds** is the job engineer and **Leslie R. Gunderson** is steel superintendent.

H. I. Steele is supervising the \$289,732 clearing and grading of a section of the Lewis & Clarke Highway near the Montana-Idaho State line for Miller & Strong, Inc., Eugene, Ore.

Les Huntington was superintendent for Walsh Construction Co., San Francisco, on construction of the Isabella Tunnel Dam main outlet works at Isabella near Kernville, Calif. Excavation of the tunnel was completed last month and contract for concreting will be

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KEY PERSONNEL for Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co. on construction of the Coulee Dam pumping plant in Washington are, l. to r.—D. T. LIND, carpenter foreman; JIM GRAVES, framing yard superintendent; MEL HOWARD, general superintendent; METZ PACHOSA, pumping plant superintendent; JACK LEONARD, pumping plant engineer, and WILLIAM REYNOLDS, office engineer.

awarded soon, probably in February. Other key personnel on the recently completed contract were Oris Holman, assistant superintendent; R. G. Miller, engineer; G. E. Hamilton, grade foreman; E. A. "Bunky" Steph, general foreman; A. E. Gilligan, foreman; Dick Young and Bob Pasalich, shifters; R. W. McAvoy, master mechanic, and J. M. Galladay, office manager.

Don Boots is the superintendent for Peter Kiewit Sons' Co., Omaha, Neb., on the firm's \$998,673 contract for grading, structures and paving of the 5.2-mi. Dodson-Bonneville Section of the Co-

lumbia River Highway in Oregon. George Moodrow is the job office manager.

Charles E. Morris is the general superintendent for McGinty Construction Co., Phoenix, Ariz., on the \$445,939 construction of the State Capitol Annex in Phoenix. Project managers are V. K. and Earl V. McGinty.

John E. Broton, for many years with Guy F. Atkinson Co. of Long Beach, Calif., most recently on the firm's Nebraska dam project, is now with Macco Corp. of Paramount, Calif., and has

completed supervision of repair work on a flume of the Kern River siphon near Kernville, Calif.

On construction of the \$2,000,000 W. & J. Sloane store building in Los Angeles by Del E. Webb Construction Co., Phoenix, Ariz., J. E. Salmon is the job superintendent, Jack Hamilton is general labor foreman, and C. E. Brown is steel foreman.

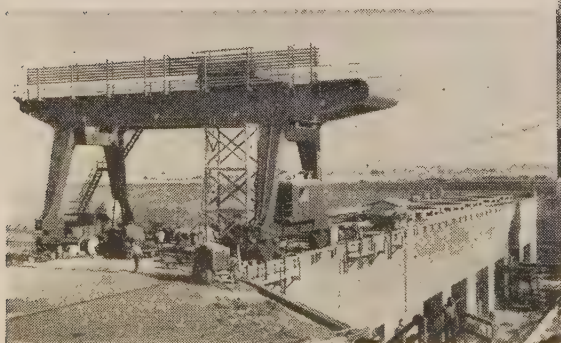
On construction of the \$960,000 Liberal Arts Building on the University of Arizona campus at Tucson, Ariz., M. M. Sundt Construction Co. of Tucson has Benn Beismier as general superintendent, Lee Carmichael as carpenter foreman, Leonard Austin as labor and concrete foreman, and Alex McKay as steel foreman. Herbert Voss is timekeeper. On construction of an 8-story building for St. Mary's Hospital in Tucson at a contract cost of \$1,200,000, the firm has John La Rue as superintendent, Ambrosio Ugalde as labor foreman, and Alex McKay as steel foreman. Frank Schmieder is timekeeper.

W. L. VonDerlinde is general superintendent for George W. Carter Co. of Los Angeles on the firm's \$650,000 contract for construction of a telephone building in Long Beach, Calif. Rufus Tucker is assistant superintendent, James Bird is labor foreman, and R. H. Noble is job office manager.



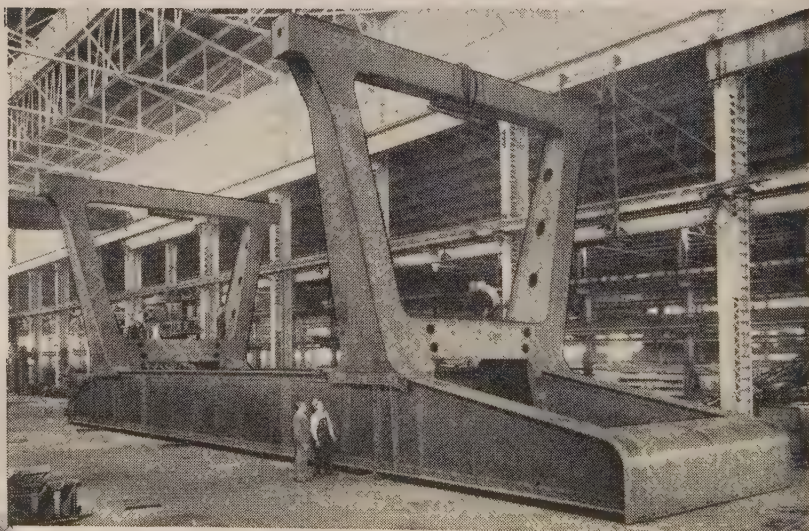
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OBITUARIES...

Henry Spears Wright, 54, chairman of Arizona's Colorado River Commission from 1941 until it was abolished in 1946, died Nov. 28 at Phoenix, Ariz. As chairman of the commission, Wright was credited with helping to bring about the Colorado River Compact and laying the groundwork for the Central Arizona Project.

George William Ashton, 53, owner of the George W. Ashton Construction Co. of Salt Lake City, Utah, died Nov. 21.

Louis H. Krohn, 58, traveling engineer for the Washington State Highway Department, died Dec. 6. He had been with the department for about 25 years.

Noah Elmer Himes, 78, retired pioneer building contractor of Spokane, Wash., died Dec. 6. For many years, he was an independent contractor in the area.

Melville Dozier, 75, executive director of the Housing Authority of the County of Los Angeles, died Nov. 9 at Los Angeles. Before becoming associated with the housing authority, he was active for 40 years in engineering and construction work in Southern California. From 1925 to 1932, he was manager of the Southern California Chapter, A. G. C.

Charles E. Shipman, 67, resident engineer for the Montana State Highway Commission at Wolf Point, died Dec. 3.

Edward Phillip Walsh, 71, retired contractor of Portland, Ore., died Dec. 6.

Patrick J. Keenan, 63, inspector for the Los Angeles Engineering Department for the past 37 years, died Dec. 7.

Wallace John Ward, 50, civil engineer, died at Nogales, Ariz., on Nov. 29. Graduated from the University of Utah in 1922 with a degree of civil engineering, he was employed by the U. S. Bureau of Public Roads for 20 years, and was one of the engineers who supervised construction of the Alcan Highway to Alaska.

Henry B. Faulconer, 73, retired contractor of Phoenix, Ariz., died Dec. 3.

John Milton Vittetoe, 63, building construction superintendent for Orr & Martin at Alamosa, Colo., died Dec. 12.

Ben N. Schiewe, general building contractor of Los Angeles, and a past president of the Los Angeles Chapter of the Building Contractors' Association, died Nov. 19.

James Barreras, 41, contractor of Albuquerque, N. Mex., died Nov. 27.

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... and one reason is the correct full-crawler all-welded wheel-type design that has enabled CLEVELANDS to deliver cleaner, straighter trench at less cost over long continuous periods of time on thousands and thousands of jobs.

... and another reason is CLEVELANDS smooth-flowing reliable power, directly applied without waste or loss and delivered through husky, efficient transmission units. CLEVELANDS give you a multitude of power and speed applications to wheel and crawlers that guarantee the correct amount of power and speed for every digging and operating condition.

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These 75-foot tapered, fluted, tubular piles with 20-foot extensions were driven to a minimum bearing of 40 tons each by a McKiernan-Terry No. 10-B-3 Double-Acting Pile Hammer, in constructing the new highway bridge at Spring Lake, Mich. Luedtke Engineering Co., contractors.

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To insure accurate driving, as well as protection from damage during driving, a McKiernan-Terry Hammer was the contractor's choice for handling these long, costly piles.

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There are ten double-acting hammers, five single-acting hammers and two double-acting pile extractors in the standard McKiernan-Terry line. This makes possible always the selection of a right hammer or extractor for any specified pile-handling conditions.

ALSO MADE BY MCKIERNAN-TERRY. The same engineering and manufacturing skill that has made McKiernan-Terry Pile Hammers so outstanding in the field of construction is applied also to bulk material unloaders, coal and ore bridges, marine equipment, cranes, bridge operating mechanisms and other important machinery of service to industry, railroads and the government.

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Contracts . . .

Summary of Major Construction Contracts Awarded Last Month

Arizona

United Concrete Pipe Corp., Box 425, Baldwin Park, Calif., was awarded a \$1,577,900 contract by the Bureau of Reclamation for construction of the Wellton-Mohawk Pumping Plants Nos. 1, 2 and 3, Wellton-Mohawk Division, Gila Project, near Yuma.

Fisher Contracting Co., Box 4025, Phoenix, was awarded a \$309,900 contract for improvements at Sky Harbor Municipal Airport, Phoenix. The work involves grading and construction of runway and taxiways, etc.

M. M. Sundt Construction Co., Box 2592, Tucson, was awarded a \$1,104,300 contract for constructing and equipping a new sewage disposal plant at Tucson.

Alfred Andersen Construction Co., 1724 Grand Ave., Phoenix, has started work on a \$2,150,000 private residential building project at Phoenix.

M. I. Poze Construction Co. of Tucson has started work on a new football stadium for the University of Arizona at Tucson under a \$768,230 contract.

Morrison-Knudsen Co., Inc., 411 W. 5th St., Los Angeles, was awarded a \$1,556,400 contract by the Bureau of Reclamation for construction of earthwork, tunnel, canal lining and structures of the Wellton-Mohawk Canal near Yuma.

California

MacDonald & Kruse, Inc., 816 Allen Ave., Glendale, has been awarded a \$1,029,000 contract by the Navy for remedial measures for subsidence at the Naval Shipyard, Long Beach. The contract calls for extensive earthwork, concrete dike walls, etc.

E. C. Nickel, Box 765, Arcadia, was awarded a \$1,049,700 contract for construction of the 50,000,000-gal. Hastings Reservoir at Pasadena.

United Concrete Pipe Corp., Box 425, Baldwin Park, was awarded an \$846,669 contract by the Bureau of Reclamation for construction of 25 mi. of concrete pipe line, ranging in size from 12 to 72 in., for a lateral distribution system from the Friant-Kern Canal. The work is located in Kern County.

Clifford C. Bong & Co., 123 N. 3rd Ave., Arcadia, was awarded a \$726,550 contract by the Bureau of Public Roads for grading of 1.8 mi. and construction of a drainage tunnel on a highway in San Bernardino National Forest, San Bernardino County.

Charles MacClosky Co., 628 Heliotrope Drive, Los Angeles, was awarded a \$503,900 contract by the California Division of Highways for construction of highway improvements in Los Angeles County on Hollywood Parkway. The job includes construction of a reinforced concrete box girder bridge.

Elmer J. Freethy, 1432 Kearney St., El Cerrito, was awarded a \$376,145 contract by the East Bay Municipal Utility District for construction of an effluent pumping station, screen wash water piping system, assembling mechanical equipment, etc., at Oakland.

Fredrickson and Watson Construction Co., 873 81st St., Oakland, was awarded a \$535,100 contract by the California Division of Highways for grading and plantmix surfacing of 3.1 mi. of highway in Santa Clara County.

Peter Kiewit Sons' Co., 345 Kieways Ave., Arcadia, was awarded a \$677,250 contract by the California Division of Highways for grading and paving a 2-lane section of the Santa Ana Parkway in Los Angeles.

Parker, Steffens & Pearce, 135 S. Park, San Francisco, was awarded the \$1,101,500 contract by the Regents of the University of California at Berkeley for construction of the reinforced concrete School of Jurisprudence building at the University.

Basich Brothers Construction Co. and Basich Bros., 3850 S. San Gabriel Blvd., San Gabriel, were awarded a \$719,700 contract by the California Division of Highways for the grading and plantmix surfacing of about 4.5 mi. of highway near Calabasas in Los Angeles County. The job includes construction of a reinforced concrete bridge.

E. L. Yeager Co., Box 87, Riverside, was awarded a \$416,250 contract by the California Division of Highways for construction of bridges and culverts, drainage dips and approaches in Imperial and Riverside Counties.

Empire Construction Co., Ltd., 344 Harriet St., San Francisco, was awarded a \$870,400 contract for construction of the Hayward Union High School buildings at Hayward. The buildings will be of wood frame.

Carrico & Gautier, 365 Ocean Ave., San Francisco, was awarded a \$638,800 contract by the Regents of the University of California at Berkeley for construction of a telescope building at Mount Hamilton University of California, Mount Hamilton.

Moore and Roberts, 693 Mission St., San Francisco, was awarded a \$608,250 contract for construction of a 75-bed, wood frame hospital building for the Mark Twain Hospital District at San Andreas.

Idaho

J. W. Brennan and W. R. Cahoon (joint-venturers), Box 507, Pocatello, were awarded the \$530,854 general contract for construction of the Liberal Arts Building at Pocatello.

Montana

Wixson and Crowe, Inc., Box 799, Redding, Calif., and **J. H. Trisdale**, Box 134, Redding, were awarded \$2,446,850 and \$2,484,360 contracts respectively for clearing the remaining 14,695 ac. of land in the Hungry Horse Reservoir area. The work is situated from 25 to 45 mi. southeast of Columbia Falls.

Askevold Construction Co., Missoula, was awarded the \$584,000 general contract by the Great Falls School District for construction of the South Side school at Great Falls. **Carson Construction Co.**, Helena, was awarded the \$364,400 general contract for construction of the West Side school.

Smith Construction Co., Nashville, Tennessee, was awarded a \$599,500 contract for construction of a 100-mi., 115-kv. transmission line from Havre to Shelby by the Bureau of Reclamation. The line will carry power generated at Fort Peck Dam.

New Mexico

Skousen-Hise Construction Co., Albuquerque, was awarded a \$461,700 contract by the New Mexico State Highway Department for grading, minor drainage structures, a multiple concrete box culvert, etc., on 10.3 mi. of U. S. 70-80 between Lordsburg and Deming. The same firm was awarded a \$455,400 contract for grading, minor drainage structures, 2 multiple concrete box culverts, etc., on 10.4 mi. of U. S. 70-80 between Lordsburg and Deming. A total of 350 working days are allowed for completion of both jobs.

Floyd Haake, 1201 Sierra Vista, Santa Fe, was awarded an \$814,500 contract by the New Mexico State Highway Department for grading, minor drainage structures, a multiple concrete box culvert, etc., on about 2.9 mi. of U. S. 85 between Las Vegas and Romeroville.

D. D. Skousen, 207 Springer Bldg., Albuquerque, was awarded a \$246,759 contract by the New Mexico State Highway Department for grading, drainage, culverts and a concrete and steel bridge on U. S. 66 between Montoya and Tucumcari.

Maxey & Leftwich, Lubbock, Texas, has started construction on family quarters buildings at Alamogordo for the Corps of Engineers under an \$800,000 contract.

Robert E. McKee, Box 637, Los Alamos, was awarded a \$619,000 contract by the Atomic Energy Commission for construction of the 2-story reinforced concrete Radiographic Research Building at Los Alamos. Work includes clearing, grubbing, etc.

Thomas Bryan & Associates, Inc., 620 M. & M. Bldg., Houston, Texas, was awarded a \$1,664,300 contract by the Atomic Energy Commission for construction of the electric and steam power plant at Los Alamos. The work includes a reinforced concrete main building, installation of turbo-generators and boilers, etc.

Oregon

Kern & Kibbe, 8706 N. Bradford St., Portland, and **McKinnon Construction Co.**, Sandy, have started construction of a jetty at the mouth of the Umpqua River in Douglas County under a \$1,141,700 contract awarded by the Corps of Engineers.

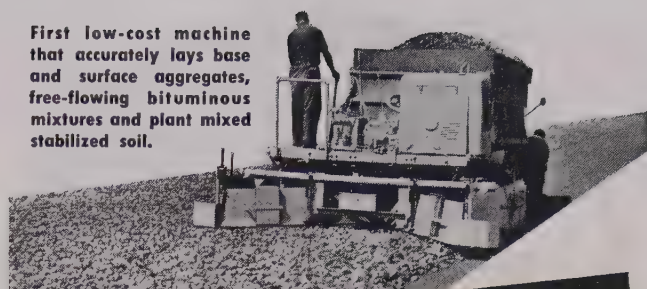
Stevenson Construction Co., Portland, was awarded a \$136,400 contract by the Oregon State Highway Commission for grading, surfacing and oiling about 5.4 mi. on the Kimberly-Long Creek Secondary Highway in Grant County.

C. E. Leseburg, Nyssa, was awarded a \$131,300 contract by the Oregon State Highway Commission for 10.9 mi. of grading, surfacing and oiling in Harney County.

Utah

Gibbons & Reed Co., 259 W. 3rd South St., Salt Lake City, was awarded a \$287,400 contract by the State Road Commission of

First low-cost machine that accurately lays base and surface aggregates, free-flowing bituminous mixtures and plant mixed stabilized soil.



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Accurately Lays up to 10" Thickness, 8 to 12½ Ft. Widths: Four-wheel drive operates entirely on subgrade or compacted base — prevents displacement of newly-laid material. Long straightedge runners carry screed independent of up-and-down machine motion, average out subgrade irregularities, positively maintain correct course thickness.

Quick Width Changes: 10' to 12½' by telescopic shaft, screed inserts. Block off for 8' to 10'.

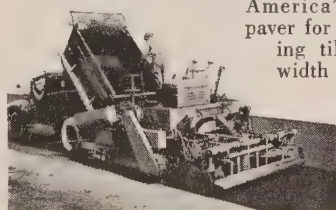
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ANDREWS EQUIPMENT SERVICE.	Spokane 9
WESTERN MACHINERY CO.	Salt Lake City and Denver 2
CENTRAL MACHINERY CO.	Great Falls and Havre
TRACTOR & EQUIPMENT CO.	Sidney, Miles City, Glasgow
WORTHAM MACHINERY CO.	Cheyenne and Billings
J. D. COGGINS & CO.	Albuquerque
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This BAER dipper
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new buckets or for repairs or
rebuilding on your old.

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Steel Products, Inc.
Auburn, Washington, U. S. A.

CALL AUBURN 838

Utah for construction of U. S. Highways 89, 50 and 91 in Salt Lake County.

Bechtel Corp., 220 Montgomery St., San Francisco, Calif., has started construction of a \$10,500,000 steam electric station at Salt Lake City for the Utah Power & Light Co.

A. O. Thorn & Sons Construction Co., Provo, was awarded a \$263,950 contract by the State Road Commission of Utah for the road-mix bituminous surfacing of about 2.5 mi. of the highway between Hailstone and Francis in Wasatch County.

Washington

Award of a \$999,750 contract to **Construction Engineers & Contractors**, 801 Port Of Tacoma Road, Tacoma, for construction of the main transmitter building for the naval communications station at Jim Creek in Snohomish County, has been authorized by the Navy Bureau of Yards and Docks.

Award of a \$2,296,800 contract to **American Bridge Co.**, Pittsburgh, Pa., for steel towers to be used for Bonneville power installations in Washington and Oregon has been announced.

An award of a \$1,193,900 contract to **MacRae Brothers**, 2733 4th Ave., So., Seattle, for construction of the first unit of Seattle's Alaskan Way Viaduct, has been held up temporarily due to a bid irregularity. **Morrison-Knudsen Co., Inc.** was second low with a bid of \$1,224,780.

Award of a \$419,850 contract for construction of a double leaf bascule bridge across the navigation lock at McNary Dam to **Willamette Iron and Steel Co.**, 3050 N.W. Front St., Portland, Ore., has been made by the Corps of Engineers.

Valley Construction Co., 7722 Rainier Ave., Seattle, was awarded a \$330,250 contract by the Seattle Board of Public Works for construction of the 18,000-ft. Maple Leaf-Haller Lake water supply line. The award was based on the firm's low bid on concrete cylinder construction of the 42- and 30-in. mains. The firm also obtained the \$589,400 contract from the Spokane City Council to construct Division F of Spokane's \$3,500,000 sewage disposal project. Division F includes a mile of tunneling.

Notice to proceed with the construction of 17.8 mi. of relocation of the Spokane, Portland & Seattle Railway along the Washington shore of the Columbia River in connection with McNary Dam has been sent to **Morrison-Knudsen Co., Inc.**, 603 Hoge Bldg., Seattle, under terms of a \$3,375,224 contract from the Corps of Engineers.

Berke Bros., Portland, Ore., with a bid of \$641,000, was awarded a contract by the Washington State Highway Department for the grading, draining and bituminous surfacing of 8.1 mi. of highway in Grant County.

F. R. Hewett Co., Parkwater, was awarded a \$369,070 contract by the Washington State Highway Department for grading, draining and surfacing 8.3 mi. of highway in Douglas and Grant Counties in the vicinity of Coulee City.

Goetz & Brennan, Seattle, with a bid of \$283,428, was awarded a contract by the Washington State Highway Department for grading, draining and surfacing of 3.5 mi. of highway in Grays Harbor County.

Northwest Construction Co., Seattle, with a bid of \$296,440, was awarded a contract by the Washington State Highway Department for clearing, grading, draining and bituminous surfacing of 3.9 mi. of highway in Skagit County. The job includes construction of a concrete slab bridge.

Wyoming

Boatwright-Smith, Rawlins, was awarded a \$511,550 contract by the Wyoming State Highway Commission for grading, draining and surfacing of 7.2 mi. of the Lander-Muddy Gap Road in Fremont County. The job includes 9 reinforced concrete culverts.

Alaska

Rogers Construction Co., 11760 N.E. Glisan, Portland, and **Babler Bros.**, 4617 S.E. Milwaukie Ave., Portland (joint venturers), were awarded a \$1,223,060 contract by the Alaska Road Commission for grading, surfacing and bituminous surfacing of about 44 mi. of the Glenn Highway. The same joint venturers also received a \$1,465,025 contract for similar work on another 43-mi. section of the Glenn Highway.

Canada

Smith Bros. & Wilson, Ltd., 1267 Richards St., Vancouver, has been awarded a \$570,000 contract for construction of a new administrative building in Vancouver for the Vancouver School Board.

Commonwealth Construction Co., Ltd., has been awarded a \$654,210 contract for construction of the Preventive Medicine Building at the University of British Columbia, Vancouver.

Portrait of Wing ... Concluded from page 85

of Bonneville power on the basis of the kilowatt year.

This was the foundation for the original Bonneville "Postage Stamp \$17.50" power rate, which is still in effect in the Pacific Northwest and applies to most of the power sold by the Bonneville Power Administration.

In July, 1941, the Denver Office was closed, whereupon Wing took a temporary step down to Senior Engineer in the San Francisco Regional Office, in preference to going to Ft. Worth, Texas, with a higher grade. In September, 1945, he was appointed Regional Engineer of the San Francisco Office, the position he now holds.

The Federal Power Commission was established in 1920, with the aim of making it possible for states and private municipal interests to utilize water resources in the public domain and on navigable streams for the development of power. Since the passage of that act, plus amendments, a great amount of such development has taken place. In California, for example, a major part of the present power development is under licensed projects. In January, 1949, sixty-four of the 117 private hydroelectric power plants in California were licensed by the FPC.

To some extent, the functions of the FPC are diplomatic. If the Northwest power shortage continues, for example, the FPC will cooperate with the state officials to ration existing supplies. In the recent King's River case, it was necessary to mediate the conflicting interests of the Reclamation Bureau, the City of Los Angeles, the P. G. & E., and the City of Fresno.

On the other hand, the Power Commission was one of several agencies to make preliminary studies of California's Folsom Dam. There, the State of California, the Army Engineers, the Reclamation Bureau and the FPC were all interested parties, and Wing heartily approves of the accurate findings that result from such cooperation.

Wing is in his element during discussions such as those that took place before the settlement of the recently completed Yellowstone River Compact. Representatives of North Dakota, Montana and Wyoming all participated, and had each state received all it asked for, it would have added up to more water than the stream provides. A compromise solution was finally approved by all—although since the Governor of Wyoming failed to sign, the Compact is now under renegotiation.

In such conferences, Wing finds the varying viewpoints of the parties involved a source of constant stimulation. Discussions are never stereotyped and Wing—frequently present in an advisory capacity—thoroughly enjoys the role of mediator.

According to his associates, Wing is eminently suited to this role. He has infinite patience, is fair in analysis, painstaking, reliable and disinclined to make snap judgments. Furthermore, he enjoys the give and take of the council table, when he can be impartial advisor rather than participant.

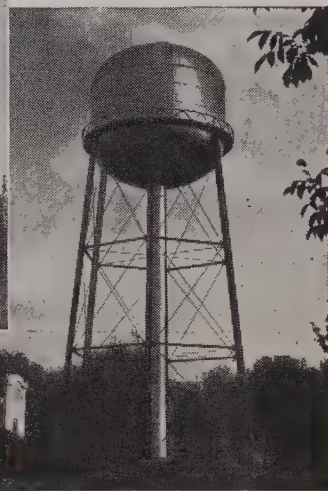
Wing is married, likes cats, and is an amateur photographer whose camera is standard equipment on all field trips. He also has an understanding attitude towards the human frailties that will crop up despite office rules and regulations.

For example, Wing's Bonneville Power report was remarkable for the short time required for its preparation. Starting with a new staff and a new office in a new city, he and the staff completed this outstanding project in a brief six months. This was only possible because the entire group worked nights, Saturdays and Sundays. Eventually, the rugged pace started to take its toll, despite the loyalty and enthusiasm of the staff.

In fact, on the last Saturday night before the Monday on which the report was to be delivered to Washington, several of the engineers felt that some extra stimulus was needed if they were to complete their part of the work. A bottle put in an appearance—despite the fact that celebrations were not supposed to take place in the august offices of the Federal Power Commission. The spirits of the staff lifted visibly—too visibly, for it became necessary for Wing to deliver an admonition in the line of duty.

"Gentlemen," he remarked quietly, "We occupy 5,000 square feet in this office—and none of it was intended to be used as a saloon."

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ELEVATED STEEL TANKS by **Pittsburgh • Des Moines**

Pittsburgh-Des Moines Elevated Steel Tanks are built in types and sizes covering the entire range of municipal water storage requirements. When you consult with a P-DM engineer, you benefit by our half-century of experience in elevated steel tank construction for cities and towns throughout America. When your P-DM Tank is installed, you gain in better water service at lower cost—unfailing dependability—guaranteed satisfaction!
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TRADE WINDS

News of Men Who Sell to the Construction West

Western Distributor News Round-up

CONTINENTAL SALES & SERVICE CO. has opened new headquarters at 3817 South Santa Fe Ave. to offer one of the most complete engine sales and service facilities for the transportation industry within the Los Angeles area, according to **B. F. Tobin, Jr.**, President. The company moved its entire operation including offices and



B. F. TOBIN, JR., upper right, is President of Continental Sales & Service Co.; **HARVEY N. HOLT**, left, is Vice-President. Facade of the firm's new headquarters building, bottom.

warehouse to the new address. Here, engines ranging from 1- to 300-hp. are shown in the large display rooms taking up most of the first floor. On display are the various models of Continental "Red Seal" Engines and Wisconsin "Air-Cooled" Engines, as well as Rockford Power Take-Offs and Industrial Clutches (gear tooth drive type). **Harvey N. Holt**, vice-president of the firm, states that one of the outstanding features of the new building will be the service department where complete facilities for maintenance and repair are available for all products handled by Continental Sales & Service.

★ ★ ★

THE LAWRENCE TOTTEN CO. of Los Angeles, San Francisco and Seattle, announce their appointment by INLAND STEEL CO. of Chicago as Pacific Coast sales agents for Inland Steel Sheet Piling. Inland Piling, rolled from special analysis open hearth steel, will now be available to Pacific Coast contractors in eight arch web and straight web sections with connections and accessories, according to **M. L. Totten**, co-owner.

★ ★ ★

EDWARD R. BACON CO. of San Francisco and the Industrial Sales Division of the WESTERN MACHINERY CO., San Francisco, announce the consolidation of their interests and operations in Northern California and Western Nevada. They will continue serving the construction, mining and industrial trade, doing all business in the name of the Edward R. Bacon Co.

with main headquarters at 2101 Folsom St., San Francisco. Offices and stocking warehouses will be maintained in San Francisco, Oakland, Fresno and Sacramento; shop service facilities in San Francisco, Oakland and Sacramento, and other field headquarters in Ukiah, Redding and Stockton. Management of the operation will remain under **Jack H. How**, who is also vice-president of the Western Machinery Co. Involved in the consolidation are the following lines: Minneapolis-Moline, Link-Belt Speeder Corp., Mandt Loaders and H & L Tooth Co.

★ ★ ★

Fred Sime, District Manager for MAC-WHYTE CO., announces the appointment of SISKIYOU TRACTOR & EQUIPMENT CO., Yreka, Calif., as distributors of Macwhyte wire rope.

★ ★ ★

L. M. Stout, District Manager for HARNISCHFEGGER CORP. at San Francisco, was a recent visitor to the firm's factory at Milwaukee.

★ ★ ★

THE C. H. GRANT CO., Berkeley, Calif., has been appointed Northern California distributors for MARION POWER SHOVEL CO., according to **Edward R. Daley**, Regional Manager.

★ ★ ★

WESTERN EQUIPMENT CO., Boise, Idaho, has replaced IDAHO MACHINERY CO. as distributors of motor graders and rollers for the GALION IRON WORKS AND MANUFACTURING CO., Galion, Ohio. The Galion territory of Western Equipment Co. covers all counties in the State of Idaho south of the County of Idaho; also the Oregon counties of Walla, Baker, Union, and Malheur, and the County of Teton in Wyoming. The northern portion of Idaho is served by MODERN MACHINERY CO. of Spokane, Wash.

★ ★ ★



HALEY

NORTHWEST SALESMEN, INC., of Havre, Mont., have been appointed distributor for Timberib products of Timber Structures, Inc., of Portland, Ore. **B. P. Haley**, president of Northwest, and his company will handle sales of Timberib glued laminated rafters, package buildings and related products. Northwest was organized in January, 1949, by Haley as manufacturer's agents and as a building material and supply house.

★ ★ ★

HOSE ACCESSORIES CO., Philadelphia, manufacturer of Le-Hi high and low pressure hose couplings, announces that its West Coast factory warehouse is now located at 1320 Santa Fe Ave., Los Angeles 21. The new warehouse, located in the heart of Los Angeles, carries a com-

plete stock of Le-Hi hose couplings, clamps, nipples and related accessories. The firm has also announced the appointment of the EAST PACIFIC CO., Portland, Ore., as manufacturers' representative for the Pacific Northwest territory, including the states of Washington, Oregon, Idaho, western Montana and British Columbia. East Pacific Co. is owned and operated by **R. B. Yettick**.

★ ★ ★

An important new distributor for White Trucks in the Seattle and Western Washington area has been named by **Wilson D. Patterson**, WHITE MOTOR COMPANY's Pacific Coast regional manager. Handling the territory will be FAEGOL MOTORS, INC., 916 Maynard Ave., Se-



RALPH ARNOT, left, Gen'l. Mgr. of Faegol Motors, and **W. D. PATTERSON**, White's Pacific Coast Regional Mgr., shake on the deal that made Faegol Seattle distributor of White Trucks.

attle, who will represent White in its Seattle area which comprises 21 counties as well as the Territory of Alaska. Faegol is headed by **Harold C. Arnot** as president and **Ralph Arnot** as vice-president and general manager.

★ ★ ★

HYSTER CO., Portland, Ore., formally opened its new industrial truck retail sales and service building at 4445 Third St., San Francisco, last month, according to **Ray Ronald**, Western division sales manager. The new store, covering 10,000 sq. ft., is located on a 4-lane, arterial highway in a



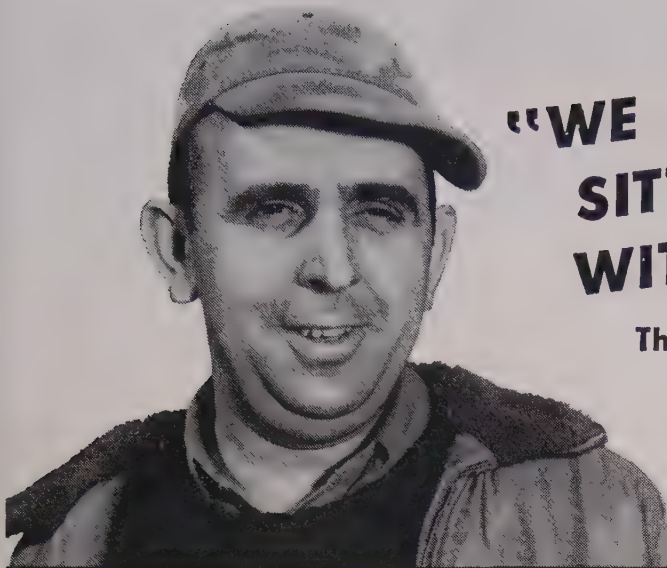
rapidly developing industrial area, and is considered one of the most modern materials handling equipment distributorships in the United States. Complete service for all makes of industrial trucks is provided in the 7,200 sq. ft. of the maintenance shop. **R. L. Golden** is manager of the organization, whose staff of 18 persons handles industrial truck sales and service in 43 counties of northern California and 11 counties of western Nevada.

★ ★ ★

According to **Fred Sime**, district manager for MAC-WHYTE CO., manufacturer of wire rope, NEVADA EQUIPMENT SERVICE, INC., has been appointed distributor for Macwhyte products in the State of Nevada.

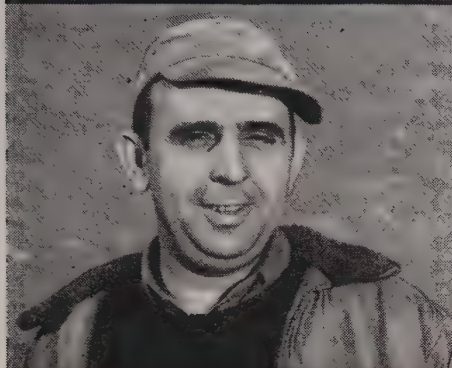
★ ★ ★

CATERPILLAR TRACTOR CO., San Leandro, Calif., has announced the CRATER LAKE MACHINERY CO. as the



"WE GOT MIGHTY TIRED SITTING UP NIGHTS WITH SICK BELTING

Then we tried the Thermoid treatment!
Now we're sitting pretty!"



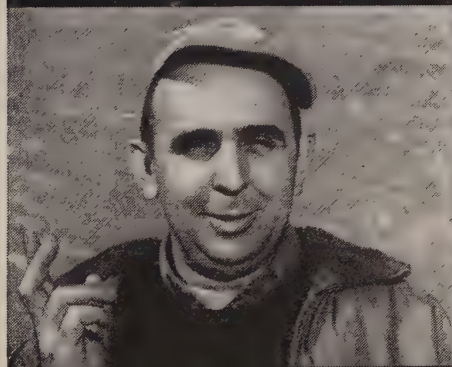
"Here at the Quarry we operate 9 hours a day, 6 days a week. Our conveyor belting on flight No. 1—where the belting really takes a beating from big, jagged, saw-toothed rocks—was giving us plenty of trouble.



"Because of our long work-week, the men began grumbling about having to put in so much extra time late at night repairing rips and tears in this beat-up belting.



"So we called up our belting distributor and he brought a Thermoid engineer around. 'What you need,' said the engineer, 'is Thermoid 'H.T.' belting with a special soft rubber ply that will cushion those rocks like a cradle.'



"That was several months ago. Now, after watching that Thermoid 'H.T.' belting take the most savage pounding imaginable, we know it is a quality product that can be depended on to stand up under plenty of slam-bang punishment.



"If you have a belting problem, Mister, why not get in touch with your Thermoid distributor. Whether your problem is run-of-mill or highly specialized, he'll help you solve it—efficiently and economically."

A Complete Line of Quality Rubber Products For All Industrial Needs

In addition to Conveyor Belting, Thermoid makes Transmission Belting, F.H.P. and Multiple V-Belts, Elevator Belting, and a complete line of Wrapped and Molded Hose, Industrial Brake Linings and Friction Materials.

It will pay you to
Specify Thermoid!

Thermoid
Company

Western Offices and Factory • Nephi, Utah, U.S.A.
Main Offices and Factory • Trenton, N. J., U. S. A.
Industrial Rubber Products • Friction Materials • Oil Field Products

new Caterpillar dealership at Klamath Falls and Medford, Ore. The new firm is headed by **Stanley Miller**, president; **G. C. Lorenz**, vice-president, and **Reuben Larsen**, secretary and sales manager. With the change goes essentially the same personnel as the new firm takes over the Reed Tractor & Equipment Co. premises at 719 Market St. in Klamath Falls. Reed Tractor was formerly dealer for Caterpillar in the area.

☆☆☆

Appointment of the **COLORADO BUILDERS' SUPPLY CO.** of Casper, Wyo., as distributors of General Motors Series 71 industrial and oil field Diesel engines has been announced by **V. C. Genn**, general sales manager of Detroit Diesel Engine Division of General Motors Corp. The territory the firm will cover includes all of Wyoming except Teton, Lincoln and Uinta Counties. The firm is no stranger to the General Motors Diesel engine as they have been distributors for the motors out of their headquarters in Denver since 1947.

☆☆☆

Ken Parks, consulting engineer, **PETERSON TRACTOR & EQUIPMENT CO.**, San Leandro, Calif., has taken over the duties of advertising manager in addition to his other responsibilities. **Bill Ahearn**, who formerly held that position, is now manager of the Los Angeles office of Lyle Hosler Advertising Agency.

☆☆☆

Western distributors for the Gumout Division of **PENNSYLVANIA REFINING CO.** have been announced. In a greatly accelerated program of promotion and sales, **F. SOMERS PETERSON CO.**, San Francisco, has been appointed to handle

TRADE WINDS

sales in California, Nevada and Arizona; **JAMES H. PAGE**, Denver, will cover the mountain states territory; **RICE BROTHERS**, Seattle and Portland, will sell in Oregon, Washington, and western Idaho; and **L. H. COX ASSOCIATES**, Minneapolis, will serve North and South Dakota and the upper middle west states.

☆☆☆

SAN JOAQUIN TRACTOR CO. is the new name for **KERN TRACTOR & EQUIPMENT CO.** of Bakersfield, Calif. The name change occurred as the firm



moved from its old location at 24th St. and Route 99 in Bakersfield to modern new headquarters (illustrated) at California Ave. on Route 99. The firm distributes the equipment lines of Allis-Chalmers, Kohring and Ingersoll-Rand. Officers remain the same. They are **L. E. Agnetti**, president and **Sam Tobias**, vice-president and general manager.

☆☆☆

PRINGLE-GERLACH MACHINERY CO., Salinas, Calif., has been appointed **CATERPILLAR TRACTOR CO.** dealer in Santa Cruz and Monterey Counties, Calif. **W. B. Pringle** and **H. W. Gerlach**, new heads of the firm bearing their names,

are taking over from **Frank Cornell** of Cornell Tractor Co. Cornell is retiring after 30 years as a Caterpillar or predecessor line dealer.

☆☆☆

LOGGERS & CONTRACTORS MACHINERY CO., Portland, Ore., with branches in Eugene and Klamath Falls, Ore., has been appointed as Oregon distributor for **LIPPMAN ENGINEERING WORKS**, manufacturers of crushers, conveyors, and related construction machinery, according to an announcement from **A. Freeman Sersanos**, president of Loggers.

☆☆☆

New Pacific Coast distributors for products of **ALLIS-CHALMERS** have been announced. **ARTHUR FORSYTH CO.**, Seattle, will handle motors and controls in King Co., Wash., and **FARM TRACTOR CO.**, Gresham, Ore., will distribute centrifugal pumps in Clackamas Co., Ore.

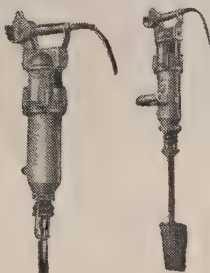
☆☆☆

WEST COAST ENGINE & EQUIPMENT CO., Berkeley, Calif., has been appointed Northern California distributors for **AEROQUIP CORP.**, manufacturers of flexible hose and detachable couplings. **James R. Williams**, sales manager, advises that complete stock and parts will be carried at the firm's main store in Berkeley and also at the branches at Sacramento, Ft. Bragg and Eureka.

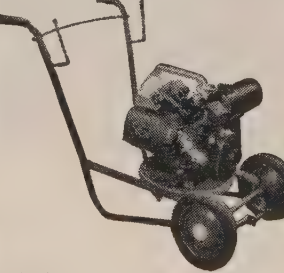
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Vernon C. Genn, general sales manager of **DETROIT DIESEL ENGINE DIVISION, GENERAL MOTORS CORP.**, was a recent visitor to the West Coast. He

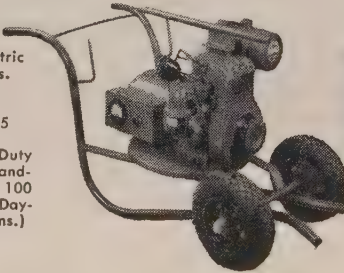
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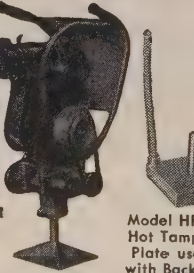
Master Red Seal Power Blow Electric Hammer & Spade
Catalog No. 688



Model 650, D.C. Generator Plant. 500 Watts continuous duty, 650 Watts intermittent duty. Mounted on Model 98 Buggy.



Model 2500, D.C. Generator Plant. 1500 Watts continuous duty, 2000 Watts intermittent duty. Mounted on Model 83 Buggy.



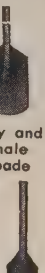
Gasoline Engine Backfill Tamper
Catalog No. 699 Revised



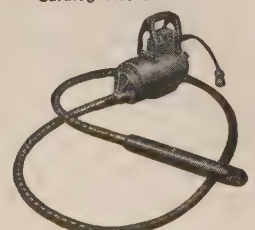
Clay and Shale Spade



Model HP-1 Hot Tamper
Plate used with Backfill Tamper



Asphalt Cutter



Electric Motor Driven Concrete Vibrator
Catalog No. 783C



Gasoline Engine Driven Concrete Vibrator
Catalog No. 783C



Concrete Surfacing Attachments



Vibratory Concrete Finishing Screenshot
Screed Sizes 6' to 36'
Catalog No. 942



Gas or Electric Turn-A-Trowel
Sizes 34" or 48" Catalog No. 939



Gas or Electric Combination Disc Float and Turn-A-Trowel
Catalog No. 939

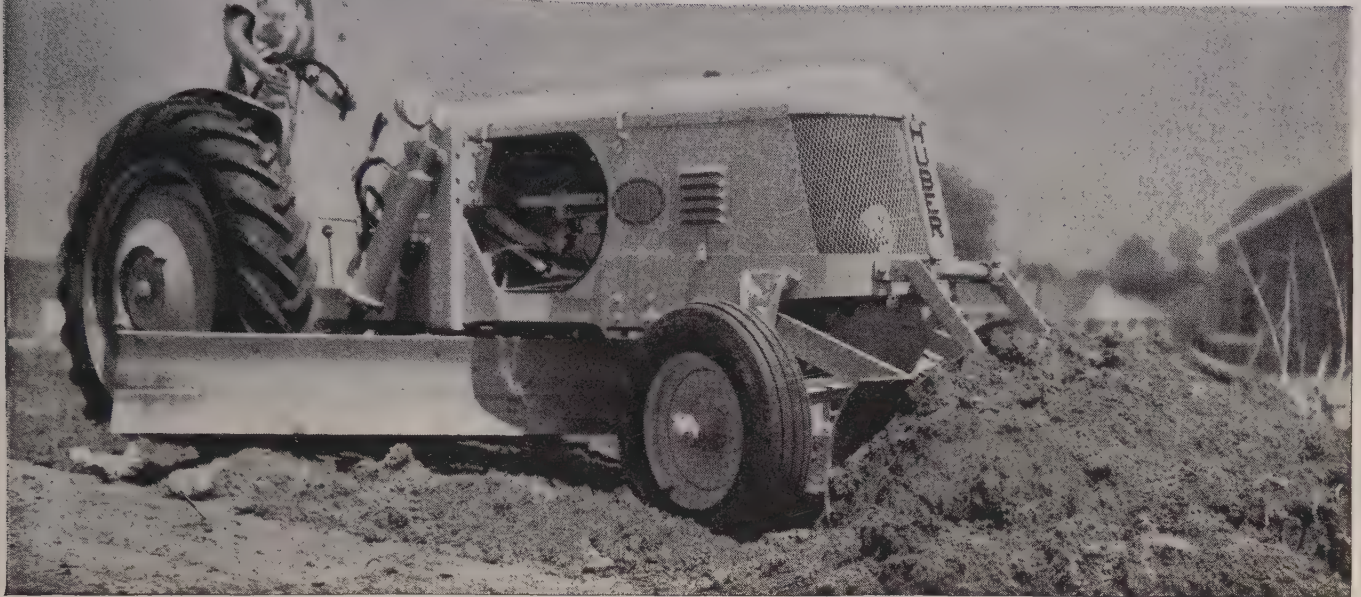
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Every feature necessary for top performance is included as standard equipment with Master Products. ON THE JOB PERFORMANCE COUNTS. Buy right — Buy Master for sure profits and low maintenance costs.

DON'T DELAY — Write today for illustrated catalogs on Master Products.

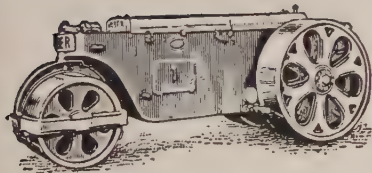
MASTER VIBRATOR COMPANY, 110 Davis Ave., Dayton, Ohio

CONSTRUCTION AND ROAD MAINTENANCE MEN MUST CUT COSTS TOO!

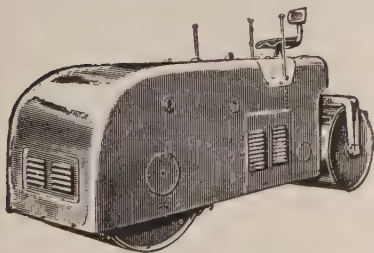


how?

USE THE MAINTAINER On Jobs Now Tying Up Big Equipment



HUBER 3-WHEEL ROLLERS
5 models—5 to 12 tons



HUBER TANDEM ROLLERS
6 models—3 to 14 tons

Put the versatile Huber Maintainer to work on your new construction or maintenance program. It will "pay off" by doing cheaper and faster the many odd jobs and maintenance work now tying up heavy equipment. It's a money maker in its own right—ideal for road, street and airport construction and upkeep. With its 42½ H.P. engine and 20 miles per hour speed the Maintainer really covers the job. With its hydraulically operated attachments it is readily converted to a bulldozer, patch roller, rotary broom, lift-loader, snow plow, berm leveler, road planer or mower. Ask any Huber owner about the Maintainer—he'll vouch for its dependability, long life and all-round performance.

Other Huber road machinery built to make your construction work more profitable includes: 3-wheel automotive type road rollers, tandem rollers and trench rollers. Write today for descriptive bulletins and name of your Huber dealer.



THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

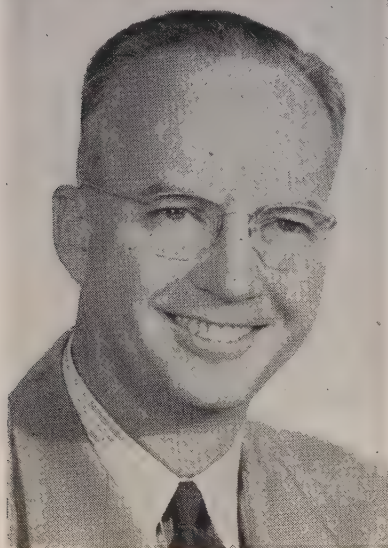
LEE & THATRO EQUIPMENT CO., Los Angeles 21, Calif.; JENKINS & ALBRIGHT, Reno, Nevada; CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque, N. M.; NEIL B. MCGINNIS CO., Phoenix, Ariz.; FEENAUGHTY MACHINERY CO., Portland 14, Oregon; FEENAUGHTY MACHINERY CO., Boise, Idaho; FEENAUGHTY MACHINERY CO., Spokane 2 Wash.; FEENAUGHTY MACHINERY CO., Seattle, 4, Wash.; EDWARD F. HALE CO., Hayward, Calif.; FOULGER EQUIPMENT CO., INC., Salt Lake City 8, Utah; THE COLORADO BUILDERS' SUPPLY CO., Denver 9, Colo.; THE COLORADO BUILDERS' SUPPLY CO., Casper, Wyoming; MONTANA POWDER & EQUIPMENT CO., Helena, Billings, Montana.

Continued from page 106

was accompanied on his trip through the Western states by **Charles M. Howell**, petroleum industry representative. While in the San Francisco Bay Area, they made their headquarters at **WEST COAST ENGINE & EQUIPMENT CO.**, Berkeley, the firm's northern California distributors. They were accompanied on calls by **Edward Scanlon**, zone manager.

☆☆☆

Newton R. Crum, 206 South El Molino, Alhambra, Calif., has been appointed manufacturer's representative for California, Arizona and Nevada by **HOSE ACCESSORIES CO.**, Philadelphia, manufacturer



NEWTON R. CRUM

of Le-Hi high and low pressure hose couplings. For a number of years, Crum was connected with the Republic Supply Co. of California, as manager of Republic's western division headquarters at Emeryville.

☆☆☆

Manufacturer Activity in the Western States



KING

DIAMOND CHAIN CO., INC., Indianapolis, Ind., announces the appointment of **Howard W. King** as West Coast District Manager with headquarters in San Francisco. King has a background of 21 years with Diamond Chain, the past 14 years as district sales representative in Chicago.

☆☆☆

Arthur H. Wyble joined the **THERMOID CO.** recently as a salesman in the Oakland-Fresno-South San Francisco district. Before joining the firm, he operated the Propellor Service Corp. at the Municipal Airport at Hayward, Calif. Thermoid Co., with main offices and factory at Trenton, N. J., and Western offices and factory

UNIT BID SUMMARY

Sewerage . . .

California—San Francisco County—City—Sewer Tunnel

M & K Corp., Fredrickson and Watson Construction Co. and Piombo Construction Co., Oakland, Calif. (joint venturers), were awarded a \$1,381,530 contract by the San Francisco Department of Public Works for construction of the Lake Merced sewer tunnel, Section B. Unit bids were submitted as follows:

(1) M & K Corp., Fredrickson & Watson Construction Co. and Piombo		(5) Haas & Rothschild, Fred J. Early, Jr. and Stolte, Inc.	
Construction Co.	\$1,381,530	— Charles L. Harney and Guy F. Atkinson Co.	1,884,821
(2) Utah Construction Co.	1,414,141	— Walsh Construction Co.	2,591,797
(3) T. E. Connolly	1,425,905	(6) Engineers' Estimate	1,557,906
(4) Peter Kiewit Sons' Co.	1,656,637		

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, junction and overflow structure	\$20,400	\$31,404	\$12,000	\$20,000	\$16,000	\$17,280
Lump sum, 4 ft. 0 in. dia. by-pass	800.00	1,300	1,000	\$2,600	\$1,300	415.00
Lump sum, reinforced concrete taper structure	\$1,200	\$1,300	400.00	\$1,500	800.00	880.00
255 lin. ft. 10 ft. 0 in. x 11 ft. 3 in. reinf. conc. sewer north of North Portal	94.00	190.00	180.00	135.00	138.00	149.00
1,077 lin. ft. 10 ft. 0 in. x 11 ft. 3 in. reinf. conc. sewer south of South Portal	105.00	196.00	220.00	185.00	160.00	149.00
3,600 lin. ft. 10 ft. 0 in. x 11 ft. 3 in. sewer in tunnel	310.00	272.00	280.00	345.00	410.00	340.00
320,000 lb. reinforcing steel	.06	.05	.11	.15	.15	.07
72 M.F.B.M. timber packing	60.00	190.00	100.00	200.00	180.00	227.00
60 cu. yd. addtl. excav. in enlarged tunnel sects.	20.00	21.00	20.00	25.00	28.00	25.00
10 M.F.B.M. temp. supports in enlarged tun. sects.	90.00	200.00	100.00	200.00	200.00	227.00
60 cu. yd. addtl. conc. in enlarged tunnel sects.	20.00	24.00	30.00	30.00	25.00	30.00
270 lin. ft. grout pipe	1.00	3.00	3.00	3.50	3.00	5.00
180 each connection to grout pipe	8.00	10.00	10.00	7.00	8.00	10.00
6,600 cu. ft. of cement pressure grouting	4.00	6.00	3.00	4.00	5.50	4.00
65 lin. ft. test hole	5.00	4.00	5.00	3.00	4.00	4.00
400 lin. ft. pressure relief drain	20.00	12.00	5.00	6.00	14.00	4.00
200 each pressure relief drain check valve	10.00	6.00	10.00	8.00	6.00	8.00
37 lin. ft. 4 ft. 0 in. dia. reinf. pipe sewer	50.00	60.00	45.00	85.00	39.00	76.00
275 lin. ft. 4 ft. 3 in. dia. spun. conc. pipe sewer	20.00	22.00	50.00	37.00	26.00	30.00
185 lin. ft. 27 in. dia. spun. conc. pipe sewer	14.00	11.00	50.00	50.00	19.00	25.00
Lump sum, junction struct. at Stanley Drive	\$1,900	800.00	500.00	\$1,100	\$1,800	500.00
Lump sum, emergency access opening	\$1,000	\$1,300	\$1,000	\$1,300	\$1,000	730.00
Lump sum, junction struct. at Park Merced sewer	\$10,900	\$11,000	\$3,000	\$6,500	\$7,000	\$2,850
Lump sum, reinf. conc. overflow struct.	\$10,800	\$17,000	\$15,000	\$16,000	\$11,000	\$12,250
Lump sum, reconstruct. of 48-in. C.M.P. culvert	\$5,500	\$3,000	\$3,000	\$8,000	\$7,000	\$5,650
39 lin. ft. manhole	20.00	60.00	35.00	23.00	22.00	48.00

Bridge and Grade Separation . . .

Washington—Douglas County—Corps of Engineers—Conc. and Steel

Guy F. Atkinson Co., Seattle, Wash., bidding \$948,620, was awarded the contract by the Seattle District, Corps of Engineers, for construction of the 1,146-ft. steel and concrete bridge across the Columbia River below the Chief Joseph Dam site near Bridgeport, Wash. The bridge is on the access road to the damsites. Unit bids were submitted as follows:

(1) Guy F. Atkinson Co.	\$ 948,620	— MacRae Bros.	\$1,173,957
(2) Bates & Rogers Construction Co.	974,925	— Morrison-Knudsen Co., Inc.	1,178,560
(3) Manson Construction & Engineering Co.	1,013,440	— J. H. Pomeroy & Co., Inc.	1,195,020
(4) General Construction Co.	1,041,320	— M. P. Butler & Carl Halvorson, Inc.	1,262,290
(5) Riggle & Creighton, Inc.	1,087,109	— J. C. Boespflug Construction Co.	1,294,685
		(6) Engineers' Estimate	908,047

	(1)	(2)	(3)	(4)	(5)	(6)
200 cu. yd. struct. excav., common	10.00	15.00	25.00	20.00	15.00	2.32
2,000 cu. yd. struct. excav., rock	10.00	15.00	25.00	20.00	25.00	7.09
1 job shoring and cribs	\$130,000	\$122,640	\$145,000	\$200,000	\$178,500	\$80,818
3,500 cu. yd. conc. in piers and abutments	50.00	46.45	40.00	40.00	70.00	51.95
820 cu. yd. conc. in superstructure	75.00	79.35	75.00	60.00	60.00	63.65
6,500 bbl. Portland cement	5.00	5.20	5.00	5.00	5.25	4.55
279,000 lb. steel reinforcement	.12	.097	.12	.12	.11	.115
81,200 cu. yd. embankment from borrow	.75	.79	1.10	1.00	.75	.94
600 cu. yd. riprap slope protection	9.50	12.40	5.00	8.00	4.00	3.36
42,000 lb. furn. steel pile	.07	.098	.08	.07	.08	.10
1,000 lin. ft. driving steel pile	2.60	1.00	3.00	2.00	6.00	1.25
1,485,000 lb. structural carbon steel	.17	.185	.18	.18	.17	.167
890,000 lb. structural silicon steel	.175	.19	.19	.19	.18	.190
48 ea. bridge drains	100.00	72.00	60.00	100.00	80.00	112.00
Lump sum, street lighting system	\$7,000	\$6,795	\$8,000	\$10,000	\$7,444	\$10,642

California—Los Angeles County—State—Undercrossings

Oberg Brothers Construction Co., Inglewood, Calif., with a bid of \$424,503, was awarded a contract by the California Division of Highways for construction of two reinforced concrete undercrossings on the Harbor Freeway at First St. and Second St. in Los Angeles. Unit bids were submitted as follows:

(1) Oberg Brothers Construction Co.	\$424,503	— J. E. Haddock, Ltd.	\$452,618
(2) Spencer Webb Co.	429,967	— C. B. Tuttle Co.	453,410
(3) R. R. Bishop & Lars Oberg	435,448	— MacDonald & Kruse	456,388
(4) Erickson, Phillips & Weisberg	437,414	— Guy F. Atkinson Co.	459,081
(5) Charles MacClosky Co.	438,880	— Carlo Bongiovanni Construction Co.	483,215
(6) W. J. Distelli & R. J. Daum Construction Co.	441,984		

	(1)	(2)	(3)	(4)	(5)	(6)
600 cu. yd. removing conc.	4.00	5.00	3.50	3.00	4.00	4.50
2,735 cu. yd. structure excav.	2.00	3.00	2.50	2.00	2.20	2.50
5,745 cu. yd. Class "A" P.C.C. (struct.)	42.00	41.00	44.00	45.00	46.02	44.00
1,060 lin. ft. rubber waterstops	3.00	2.00	2.00	2.00	1.50	2.50
20,920 lin. ft. furn. steel piling	2.32	2.50	2.25	2.20	2.32	2.40
635 each driving piles	20.00	18.00	25.00	31.00	16.00	20.00
65 ea. steel pile splices	16.00	20.00	12.00	20.00	20.00	18.00

(Continued on next page)

*want to lift
22,450 lbs. with 90 ft.
boom at 20 ft. radius?*

**YOU NEED A BAY CITY 190
CRANEMOBILE**



*want to use 140 ft.
boom and jib?*

**YOU NEED A BAY CITY 190
CRANEMOBILE**

*want to set
a 25 ton load gently
and with accuracy?*

**YOU NEED A BAY CITY 190
CRANEMOBILE**

Yes, with the 25 ton capacity 190 CraneMobile you get the answers to these questions, plus greater flexibility and mobility backed by bigger power units, easier operation and higher performance. We would like to tell you more about these fast reliable CraneMobiles, available in capacities from 7½ to 25 tons. Write us today.

BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN



BAY CITY



SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

TRADE WINDS

at Nephi, Utah, manufactures industrial rubber products, friction materials and oil field products.



WACKER

R. G. LeTOURNEAU, INC., Peoria, Ill., has announced the appointment of **George Wacker** as Western sales manager, succeeding **O. A. "Jack" Williams**. Wacker for some months has been in charge of the company's sales activities in northern California. Coming to LeTourneau in 1947, his

first position was field engineer. As Western sales manager with headquarters at Peoria, he will supervise the activities of LeTourneau district sales representatives and assist LeTourneau distributors in Oregon, Washington, California, Idaho, Nevada, Arizona, Utah, Alaska and British Columbia.

William H. Kilkenny, well-known West Coast materials handling engineer, is the new general manager of the **HYSTER CO.** Southern California retail store at 5301 Pacific Building, Huntington Park, Calif. Since the war's end, Kilkenny has been engaged as a materials handling field consultant and in sales administrative work for the Hyster Co., and has planned many of the large industrial installations on the West Coast for the Portland firm.

R. B. Boand has been named sales manager and **R. G. Noble** is the new manager of advertising and sales promotion for **Tuffy Slings and Towlines**, according to **Les Schraub**, vice-president of **UNION WIRE ROPE CORP.**, Kansas City, Mo. The two sales executives, who are making their headquarters at Kansas City, are products of the sales training plan successfully used by Union Wire for several years.

According to **Hall Kirkham**, president of the **HYDRAULIC EQUIPMENT CO.**, Cleveland, Ohio, West Coast sales activity has necessitated permanent West Coast representation. **C. F. Rayment** has been appointed Western Sales Representative with offices at 48 Mariposa Way, Walnut Creek, Calif. The firm makes a complete line of oil-hydraulic pumps, valves and cylinders.

BRODERICK & BASCOM ROPE CO., St. Louis, has opened a new branch and warehouse in Los Angeles, located at 2441 Hunter St. The new plant will make a comprehensive stock of B & B wire rope and braided safety slings more readily available in California. Complete rigging facilities are a feature of the new establishment.

Creation of a new **MACK TRUCK CO.** territorial sales unit, to be known as the Southwestern Division and with headquarters at Dallas, Texas, is announced by **A. C. Fetzer**, vice-president. Included in this realignment are the company's already-established Dallas, Houston, Oklahoma City and New Orleans offices. Heading the new

30 cu. yd. Class "A" P.C.C. (sidewalks)	40.00	35.00	30.00	24.00	40.00	35.00
690 lin. ft. 6-in. standard drain tile	1.00	1.50	1.00	.50	2.00	1.25
60 cu. yd. filter matl.	5.00	5.00	5.00	6.00	8.00	7.50
1,108,000 lb. bar reinf. steel	.072	.08	.075	.07	.07	.075
748 lin. ft. steel railing	8.50	9.00	8.25	8.00	8.10	8.25
50,500 lb. gratings	.23	.18	.17	.20	.25	.25
460 cu. yd. basement fill	3.00	1.00	3.00	1.00	3.00	2.00
190 lin. ft. 6-in. cast iron pipe	3.00	4.00	4.00	2.50	5.00	4.00
Lump sum, electrical equipment	\$6,000	\$8,000	\$6,000	\$6,486	\$2,860	\$7,000

Washington—Cowlitz County—State—Conc. Piers

Peter Kiewit Sons' Co., Longview, Wash., with a bid of \$196,914, was awarded a contract by the Washington Department of Highways for construction of steel and concrete piers for the Cowlitz River Bridge at Kelso. A total of 180 calendar days will be allowed for completion. Unit bids were submitted as follows:

(1) Peter Kiewit Sons' Co.	\$196,914	(6) Manson Construction & Engineering Co.	\$233,690
(2) General Construction Co.	206,539	— Anderson Bridge Construction Co.	233,700
(3) M. P. Butler	216,920	— Guy F. Atkinson Co.	264,448
(4) MacRae Bros.	223,516	— Lee Hoffman	323,598
(5) Scheumann & Johnson	231,890		

	(1)	(2)	(3)	(4)	(5)	(6)
2,200 cu. yd. structure excav.	2.00	2.00	7.00	3.50	8.00	3.00
Lump sum, shoring and cribs	\$53,000	\$52,000	\$60,000	\$85,500	\$55,000	\$60,000
2,910 cu. yd. concrete class F in place	32.00	32.50	30.00	27.00	35.00	40.00
754 cu. yd. concrete class H in place	21.00	24.00	30.00	27.00	30.00	25.00
84,000 lb. steel reinf. bars in place	.09	.10	.10	.10	.12	.11
21,000 lin. ft. furn. timber piling (untreated)	.50	.59	.50	.47	.50	.50
468 only driving timber piles (untreated) in place	25.00	33.50	25.00	26.00	30.00	25.00
2 only furn. and driving timber test piles in pl.	400.00	500.00	500.00	475.00	100.00	200.00

Waterway Improvement . . .

Washington—Grant County—U. S. B. R.—Channel Improvements

Morrison-Knudsen Co., Inc., Seattle, Wash., with a bid of \$1,691,666, was awarded the contract by the Bureau of Reclamation for river channel improvements on the Columbia River below Grand Coulee Dam. Work will include resloping of the west river bank, quarrying of rock, and placing protective material on the slopes. The job will also include the placing of a large quantity of riprap and armor rock on the east bank. Unit bids were submitted as follows:

(1) Morrison-Knudsen Co., Inc.	\$1,691,666	— Macco Corp.	\$2,547,196
(2) Western Contracting Corp.	1,811,311	— The Utah Construction Co.	2,768,857
(3) Peter Kiewit Sons' Co.	2,184,267	— Guy F. Atkinson Co.	3,057,512
(4) Vinnell Co., Inc.	2,243,135	— Winston Bros. Co.	3,235,045
(5) C. F. Lytle Co. and Amis Construction Co.	2,436,640	(6) Engineers' Estimate	2,116,650

	(1)	(2)	(3)	(4)	(5)	(6)
146,000 cu. yd. excav., common, for left riverbank resloping and left powerhouse road reloca.	.37	.67	.68	.67	.55	.60
1,000 cu. yd. excav., rock, for left riverbank resloping and left powerhouse road reloca.	2.10	2.50	1.00	2.00	2.40	2.25
180,000 cu. yd. excav., rock, for haul road to quarry.	.78	1.10	1.10	1.36	1.73	1.40
800 cu. yd. excav., common for structs.	2.10	4.50	4.80	2.80	3.50	3.00
1,500 cu. yd. excav., common for trenches	2.10	1.95	2.50	1.20	3.50	1.50
800 cu. yd. stripping filter blanket matl. deposit.	.21	.18	.30	.50	.41	.50
500 cu. yd. resloping exist. riprap rock on left riverbank in vicinity of deflection sneave anchor for puller machine No. 1	2.10	6.25	2.35	2.10	4.70	5.00
218,000 ton furn. and plac. armor rock on riverbank slope	2.30	1.65	2.60	2.40	2.15	2.50
500,000 ton furn. and plac. riprap rock on riverbank	.84	1.35	1.40	1.62	1.41	1.50
6,500 cu. yd. filter blanket	.83	.73	1.25	.65	.79	.90
6,000 ton loading and placing armor rock from stockpile	1.30	3.40	1.53	1.50	1.57	1.50
30,000 ton furn. and deliv. riprap rock to the gov't.	.99	1.22	1.10	.90	1.27	1.25
10,000 ton furn. and deliv. armor rock to the gov't.	2.86	2.05	2.80	2.10	2.14	3.00
200 cu. yd. backfill for structs.	1.82	1.25	.60	1.00	1.25	1.25
1,500 cu. yd. backfill for trenches	1.56	1.15	.60	.60	4.70	1.00
40 cu. yd. backfill about exposed sewer line from septic tank	3.65	3.25	1.25	7.00	6.30	2.00
1,200 cu. yd. compacting backfill	3.10	3.25	3.00	4.00	4.70	2.50
2,200 cu. yd. constructing Fiddle Creek embankment.	1.05	.30	.22	.50	.35	1.50
19,500 cu. yd. overhaul for filter-blanket matl.	.23	.24	.15	.20	.25	.25
18,000 ton-mi. overhaul from upriver stock pile.	.153	.11	.30	.09	.20	.20
35,000 M. ton stas. overhaul for riprap rock and armor rock from haul road excav. and quarry.	3.65	2.33	5.50	2.50	2.67	5.00
700 M. cu. yd. stas. overhaul for matls. excav. for left riverbank resloping and left powerhouse road relocation	5.50	4.65	6.50	5.00	4.50	15.00
12 cu. yd. conc. in structs.	105.00	110.00	93.00	80.00	110.00	75.00
210 cu. yd. conc. in culvert	52.00	70.00	50.00	50.00	63.00	90.00
9,000 sq. ft. conc. in sidewalks	.62	.45	.40	.50	.61	.50
68 cu. yd. conc. in curbs	105.00	49.00	53.00	50.00	63.00	80.00
125 cu. yd. conc. in ditch lining	32.00	36.00	26.00	40.00	63.00	50.00
7 cu. yd. conc. in light standard bases	63.00	75.00	93.00	60.00	80.00	65.00
35 cu. yd. conc. in guy anchor and sub-sta. platform	21.00	46.00	50.00	60.00	63.00	60.00
3 cu. yd. conc. around conduit	65.00	100.00	26.00	60.00	63.00	50.00
850 sq. ft. furn. and plac. preformed bitum.-fiber-type joint filler	.62	2.25	1.00	3.00	1.30	1.50
31,000 lb. furn. and plac. reinf. bars	1.25	.15	.13	.15	.24	.16
600 lb. furn. and installing miscel. metal work.	.52	.50	.50	.60	1.10	.50
2,000 ton furn. and plac. cr. rock ballast	3.00	3.00	1.50	3.00	6.15	2.00
500 ton furn. and plac. cr. rock top crse. and keystone	3.65	5.00	2.15	3.50	7.55	3.00
15 M. gal. watering for road work	12.00	3.85	2.00	10.00	4.80	5.00
7,000 sq. yd. asph.-conc. leveling crse. in wearing crse.	3.85	2.50	1.70	1.50	3.00	2.00
94 ton furn. asph. for asphaltic conc.	48.00	50.00	33.00	50.00	69.00	40.00
1,800 lin. ft. furn. and laying 10-in. diam. enamel-coated steel pipe with couplings	15.50	7.50	6.60	9.00	12.50	5.00
1,300 lb. furn. and installing cast-iron flanged fittings and valves for 10-in. pipe	.75	1.15	.42	1.00	3.00	.75
1 only furn. and installing fire hydrant complete.	\$60.00	\$95.00	\$300.00	\$300.00	\$425.00	\$300.00
90 lin. ft. furn. and laying 3-in. galv. pipe, fittings and valves	6.40	2.75	2.50	6.00	3.60	2.75
750 lin. ft. furn. and laying 1½-in. std. galv. pipe and fittings	2.25	1.25	1.40	1.00	1.30	1.75
50 lin. ft. furn. and laying 1-in. std. galv. pipe, fittings and valves	1.38	1.75	1.25	1.00	1.90	1.25
400 lin. ft. furn. and laying 4-in. vitrified clay pipe and fittings for sewer lines	1.87	1.50	2.20	1.00	2.00	1.80
Lump sum, removing, salvaging and disposing of exist.						

(Continued on next page)

PLANT OPERATORS and CONTRACTORS ALIKE BENEFIT FROM NOBLE ADVANTAGES

This Noble CA154, formerly owned by Guy F. Atkinson Co., now batches ready-mix for Chandler's Palos Verde Sand & Gravel at Lomita, Calif. It has a 2000 cu. ft. cement silo, semi-automatic batcher, and a NOBLE manually-operated water tank. Chandler, who took the plant down, moved, and re-erected it, has set his storage bunkers in the bank and the batching plant on the pit floor; thus ramps and special equipment for filling storage bins are eliminated.



4 REASONS WHY YOU'LL FIND NOBLE BATCHING PLANTS PROFITABLE

1. **Saves Cement and Time**—Central cement compartment premixes cement with aggregate, reduces mixing time, eliminates dust and cement loss.
2. **No Guesswork** — NOBLE back - balance scales and controls permit batching to within 0.2% . . . every batch meets specifications.
3. **Easy to Erect** — Shop fitting before shipping, plus all-welded center section containing all scales and controls, insures quick, easy, low-cost erection.
4. **Quick Service** — NOBLE parts and service are within a few hours of any Western job or plant, ready to help you with erection, batching and repair problems.

A SIZE TO FIT YOUR NEEDS

You can get NOBLE standard plants with aggregate bin capacity from 80 to 1500 tons, cement silo sizes from 500 cu. ft. to 7500 bbls., and 1, 2, 3, or 4-yd. weigh hoppers. Our engineers will gladly help you plan the plant layout best fitted to your needs. No obligation. Wire, write or phone us for help NOW.

DESIGNERS AND BUILDERS OF

CEMENT AND AGGREGATE BATCHING PLANTS . . . BULK CEMENT PLANTS . . . AGGREGATE BINS AND CEMENT SILOS . . . STEEL FORMS FOR CONCRETE CONSTRUCTION JOBS . . . TUNNEL AND DRILL JUMBOS CONVEYORS AND ELEVATORS . . . WEIGH METERING DEVICES

NOBLE CO.

1860-7th STREET • OAKLAND 20, CALIFORNIA • TEMPLEBAR 2-5785

Los Angeles Office: 411 WEST FIFTH STREET • PHONE MADISON 1031

STAR MACHINERY COMPANY, Seattle; ENGINEERED SALES, San Antonio; HALL-PERRY MACHINERY COMPANY, Butte; RAY L. HARRISON CO., Albuquerque; LOGGERS & CONTRACTORS MACHINERY CO., Portland; EQUIPMENT SALES CORP., Oklahoma City, Okla.; TRI-STATE EQUIPMENT CO., El Paso; TRI-STATE EQUIPMENT CO., Spokane; J. K. WHEELER MACHINERY CO., Salt Lake City; CONNELL BROS., LTD., San Francisco; SIERRA MACHINERY CO., Reno, Nevada.

TRADE WINDS

sales division is **D. C. Wheeler**, recently elected a vice-president of the company.

☆☆☆

MOTOROLA, INC. has announced plans for erection of a new research laboratory and specialized production plant at Phoenix, Ariz. Allison Steel Manufacturing Co. will erect the 40,000-sq. ft. building on a 15-ac. plot. **Daniel E. Noble**, Vice-President and head of the communications and electronics division, will be in charge of erection and operation of the laboratory.

☆☆☆

Harry Jackson, area service manager of **BARBER-GREENE CO.**, was a recent visitor to Hawaii.

☆☆☆

H. G. Engle, zone manager of **FOUR WHEEL DRIVE AUTO CO.**, was a recent visitor to the West Coast.

☆☆☆

L. W. Rodolff, district manager of **GARDNER-DENVER CO.**, recently made a trip back to the factory at Quincy, Ill.

☆☆☆

E. C. O'Connell was recently appointed district manager of **INDEPENDENT PNEUMATIC TOOL CO.**, with headquarters at San Francisco.

☆☆☆

W. L. Patterson, regional manager of **WHITE MOTOR CO.**, was a recent visitor to the factory at Cleveland for a regional managers meeting.

☆☆☆

Anticipating further growth of its Pacific Coast business, the **SOULE STEEL CO.** has started construction to enlarge its San Francisco general offices.

☆☆☆

A new concern, **BISHOP CONCRETE READY-MIX, INC.**, is now operating at Bishop, Calif. Owners are **Ken Hartnett**, **Jack Mitchum** and **Roy Dennis**.

☆☆☆

MACK TRUCK CO. has completed a series of national meetings devoted to sales and advertising and plans for the coming year. Meetings on the West Coast were held in Los Angeles and Seattle, at which Mack's entire sales personnel, including distributors, were present. Representatives from the firm's headquarters in New York City attending included **A. C. Fetzer**, vice-president and general sales manager; **L. E. Matzner**, in charge of the company's advertising, and **M. C. Horine**, manager of the sales training division. One of the features of these meetings was to explain the company's sales training program which will be undertaken in the West, commencing in January, and will consist of a two weeks' sales course for every member in the Western Division, including district managers, sales representatives and distributors. **J. C. Rowold**, vice-president and division manager with headquarters in Los Angeles, was host at the meetings held in the West.

☆☆☆

Walter J. Maytham, Jr., formerly of Chicago, has been appointed Pacific Coast district manager for the **WESTINGHOUSE ELECTRIC CORP.**, according to **T. Fort** of Pittsburgh, Pa., manager of apparatus sales. Maytham will take over the duties

3-in., 6-in. and 8-in. cast-iron water lines.....	\$5,210	\$4,500	\$2,500	\$5,000	\$2,700	\$1,500
50 lin. ft. furn. and laying 12-in. diam. conc. culv. pipe.....	3.10	3.00	4.50	2.00	6.30	2.50
40 lin. ft. laying 18-in. diam. corru. metal pipe.....	1.20	1.50	2.50	2.00	2.50	1.50
135 lin. ft. furn. and install. elect. metal conduits and fittings 1-in. in diam. and smaller.....	2.00	1.50	2.10	1.00	1.60	1.50
250 lin. ft. furn. and install. elect. metal conduits and fittings larger than 1-in. in diam.....	3.25	2.95	3.35	1.20	3.00	2.50
50 lb. furn. and install. grounding cables.....	2.40	1.50	2.20	4.00	1.60	2.00
50 lb. installing ground rods.....	.60	.50	1.25	4.00	.80	1.50
Lump sum, const. of bulk fuel storage plant and pump hse.....	\$2,500	\$4,100	\$2,800	\$4,000	\$7,850	\$3,000
Lump sum, moving, relocating and altering office bldg.....	\$3,125	\$4,950	\$4,000	\$7,500	\$6,300	\$8,000
0.75 mi. removing, salvaging, and deliv. exist. railroad track materials.....	\$4,200	\$7,920	\$3,600	\$7,500	\$11,000	\$5,000
250 lin. ft. removing and disposing of conc. sidewalks and curbs.....	.60	1.25	1.00	2.00	1.50	1.50
Lump sum, relocating guy cable "F" for cableway head tower.....	730.00	150.00	300.00	750.00	\$1,000	\$1,000
Lump sum, removing Fiddle Creek bridge.....	\$1,640	\$3,300	\$1,250	\$3,500	\$3,104	\$2,000
Lump sum, removing conc. piers and repairing exist. facil.....	310.00	400.00	400.00	400.00	700.00	500.00
Lump sum, installing fence and placing gravel walkway around substation platform.....	300.00	500.00	500.00	250.00	550.00	300.00
Lump sum, assembly of 6 x 18 pontoon barge.....	\$23,000	\$20,000	\$5,000	\$50,000	\$29,600	\$10,000
Lump sum, installing, dismantling and removing cross river ferry.....	\$50,000	\$30,000	\$46,000	\$20,000	\$34,600	\$25,000
350,000 ton transporting mats. on cross river ferry.....	.40	.30	.49	.60	1.26	.10
15,000 cu. yd. broken rock in quarry.....	.63	1.50	1.25	.60	.80	1.00

Irrigation...

California—Merced County—Bur. of Reclam.—Earthwork & Struct.

Morrison-Knudsen Co., Inc., and M. H. Hasler Construction Co., Los Angeles, Calif., with a bid of \$2,173,888, were low before the Bureau of Reclamation at Tracy, Calif., for the construction of earthwork, concrete lining and structures, Sta. 4108 to Sta. 4535 of the Delta-Mendota Canal. The work is located near Dos Palos, Calif. A total of 570 calendar days are allowed for completion. Unit bids were submitted as follows:

(1) Morrison-Knudsen Co., Inc., and M. H. Hasler Construction Co.....	\$2,173,888
(2) Western Contracting Corp.....	2,248,671
(3) Peter Kiewit Sons' Co.....	\$2,325,906
(4) Engineer's estimate.....	1,857,653

	(1)	(2)	(3)	(4)
1,950,000 cu. yd. excav. for canal.....	.16	.18	.16	.15
100,000 sta. cu. yd. overhaul.....	.02	.03	.02	.02
50,000 cu. yd. compacting embankment.....	.50	.70	.40	.30
7,000 cu. yd. excav. for drainage channels and dikes.....	.50	.75	.50	.30
35,000 cu. yd. excav. for struts.....	.60	1.60	.75	.80
9,500 cu. yd. backfill.....	.60	1.00	.60	.55
6,500 sq. yd. compacting backfill.....	3.50	4.90	3.00	3.00
495,000 sq. yd. trimming foundations for conc. lining.....	.38	.38	.47	.30
300 sq. yd. dry-rock paving.....	6.00	7.00	9.00	6.00
3,700 cu. yd. concrete in struts.....	75.00	65.00	59.85	55.00
53,600 cu. yd. conc. in unreinf. conc. canal lining.....	11.25	11.15	14.00	9.00
86,000 bbl. furn. and handling cement.....	3.15	3.20	3.20	3.50
488,000 lb. furn. and placing reinf. bars.....	.10	.10	.09	.09
1,980 sq. ft. furn. and placing elastic filler matl. in joints.....	3.00	2.00	2.00	2.00
625 lin. ft. placing rubber water stops in joints.....	2.50	2.00	1.60	1.80
960 lb. furn. and placing metal water stops in joints.....	.50	.45	.60	.40
190 M.B.M. furn. and erecting untreated timber in struts.....	250.00	240.00	220.00	225.00
5,040 lin. ft. furn. 20-ft. treated timber piles.....	1.50	1.60	2.00	.90
8,310 lin. ft. furn. 30-ft. treated timber piles.....	1.50	1.50	2.20	1.00
10,000 lin. ft. driving treated timber piles.....	2.30	3.40	1.75	1.50
200 cu. yd. gravel subbase under struts.....	7.60	5.00	7.00	5.00
25,000 lin. ft. constructing graded sand drains.....	2.00	2.30	2.00	1.40
50,000 lin. ft. const. graded sand and gravel drains with 6-in. sewer pipe.....	2.60	2.70	2.70	2.25
300 lin. ft. furn. and laying 6-in. sewer pipe with cem. joints for drain outlets.....	2.10	1.40	1.20	2.00
60 outlet boxes furn. and install outlet boxes for drains.....	100.00	60.00	30.00	40.00
4 lin. ft. furn. and laying 12-in. diam. std. str. reinf. conc. culv. pipe.....	20.00	3.50	8.00	5.00
800 lin. ft. furn. and laying 18-in. diam. std. str. reinf. conc. pipe with rubber gasket or copper seal joints.....	8.10	9.10	8.00	7.50
900 lin. ft. furn. and laying 24-in. diam. std. str. reinf. conc. pipe with rubber gasket or copper seal joints.....	11.00	12.10	11.00	10.50
220 lin. ft. furn. and laying 30-in. diam. std. str. reinf. conc. pipe with rubber gasket or copper seal joints.....	15.00	17.40	14.00	13.75
220 lin. ft. furn. and laying 36-in. diam. std. str. reinf. conc. pipe with rubber gasket or copper seal joints.....	19.75	20.40	17.00	17.00
540 lin. ft. furn. and installing 18-in. diam. welded steel pipe.....	18.50	18.50	18.00	14.00
560 lin. ft. furn. and installing 24-in. diam. welded steel pipe.....	30.00	29.00	21.00	25.00
150 lin. ft. furn. and installing 30-in. diam. welded steel pipe.....	41.50	44.00	31.00	31.00
150 lin. ft. furn. and installing 36-in. diam. welded steel pipe.....	45.00	49.00	36.00	38.00
130,200 lb. installing gates and gate hoists.....	.17	.16	.50	.14
19,500 lb. installing misc. metalwork.....	.40	.25	.22	.25
11,500 lb. furn. and installing misc. metalwork.....	.70	.55	.27	.45
520 lin. ft. furn. and installing 3/4-in. diam. electrical metal conduits.....	2.75	2.10	1.00	1.50
420 lin. ft. furn. and installing 1 1/2-in. diam. electrical metal conduits.....	3.00	2.70	1.30	2.00
20 lin. ft. furn. and installing 2 1/2-in. diam. electrical metal conduits.....	4.85	4.10	2.00	3.00
300 lb. furn. and installing electrical conductors and ground wires.....	1.80	1.40	2.00	1.80

Water Supply...

California—Los Angeles County—City—Concrete Water Mains

Pipeline Construction Co., Riverside, Calif., was low before the Board of Water Commissioners at Long Beach, Calif., for construction of 36-in. steel-cylinder concrete water mains under various streets in Long Beach. The firm's total bid for construction of 11,177 lin. ft. of pipe, prestressed (item 1) was \$334,695. Total bid using not prestressed pipe (item 2) was \$348,107. Unit bids were submitted as follows:

	Prestressed	Not Prestressed
(1) Pipeline Construction Co.....	\$334,695	\$348,107
(2) Steve P. Rados.....	334,764	352,089
(3) G. E. Kerns.....	343,725	354,902
11,177 lin. ft. constr. of 36-in. steel cyl. concr. water pipe, prestressed.....	(1)	(2)
11,177 lin. ft. constr. of 36-in. steel cyl. concr. water pipe, no prestressed.....	25.10	24.35
	26.30	25.90

(Continued on next page)

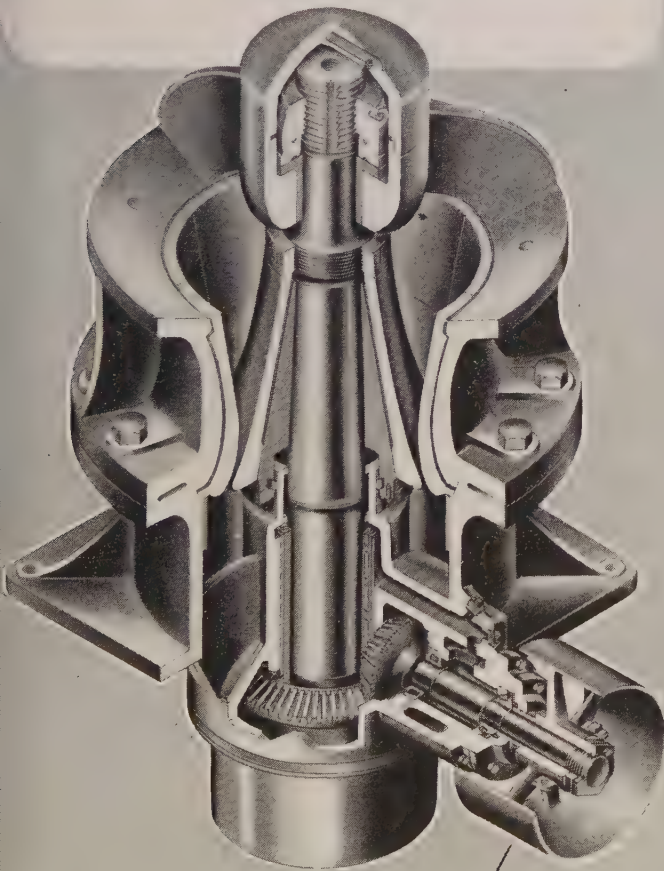
Job-Produced Aggregate Costs Less . . .



The cost of aggregate used on large construction projects can be reduced by producing it on the job with a Traylor TY Reduction Crusher. This rugged machine is unrivalled for simplicity of design and trouble-free operation. With a bare minimum of maintenance, it assures a *steady* flow of a *uniform* product, remarkably free from slabs and fines.



A TRAYLOR TY's great working range offers greater "job-flexibility" than several less adjustable machines. With a Traylor TY on the job you are sure of having the *right* product at the *right* time . . . in the *right* amount. Plan now to cut aggregate costs and increase profits on your next job with a Traylor TY Reduction Crusher.



When Traylor Curved Concaves and Bell Heads are on the job

power is used efficiently as a direct crushing force. Curved crushing surfaces check lifting and churning of material . . . reduce power loss and excessive waste fines. The increased capacity of each succeeding zone in the crushing chamber eliminates choking and packing . . . assures continuous, trouble-free production to keep pace with the tightest schedule. Write for bulletin 5112 for more complete details on a Traylor TY Reduction Crusher.

TRAYLOR ENGINEERING & MANUFACTURING CO.
301 Mill St., Allentown, Pa.

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Rotary Kilns, Coolers and Dryers
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A "TRAYLOR" LEADS TO GREATER PROFITS

TRADE WINDS

which have been carried by **Chas. A. Dostal**, vice-president, who retires next May after more than 43 years of service with the company. Maytham will make his headquarters in San Francisco. For the past five years he has been manager of industrial sales in the company's Northwestern District.

☆☆☆

Appointment of **Roger Stewart** as sales engineer and **Euclid Martin** as sales representative has been announced by **MARTIN IRON WORKS**, Los Angeles, manufacturer of industrial gates widely used in the construction field for drainage purposes. Stewart will supervise all sales activities for the 11 Western states and Texas. Euclid Martin will be in charge of sales for the San Joaquin and Sacramento Valleys in California.

☆☆☆

J. W. Schoen, vice-president and sales manager of **LA PLANT-CHOATE MANUFACTURING CO., INC.**, visited the West Coast recently. He was accompanied on his calls by **William J. Scholvin**, Western branch manager. He returned to Detroit by way of Los Angeles, El Paso and Ft. Worth, Texas.

☆☆☆

Belfield Valve division of **MINNEAPOLIS-HONEYWELL REGULATOR CO.** is adding to its field sales staff in a new and expanded sales and manufacturing program. This program, according to **W. H. Steinkamp**, field sales manager, will cover the entire country. Those assigned to full time on regional valve sales include **William Clements** in the Pacific, north coast and mountain regions, with headquarters in Los Angeles.

☆☆☆

To promote facilities and service for **KAISER GYPSUM** customers in the Western states, two important personnel changes were recently announced by **Gil Richards**, general sales manager. **Jerry Donoghue**, formerly district sales manager for Southern California, will become product manager of lath and plaster. Replacing him at the Long Beach headquarters will be **Ralph Markham**. Donoghue, whose territory will be throughout the West, has been associated with the plastering trade since 1921. Markham joined Kaiser Gypsum after work at the Hungry Horse Dam, where he was associated with General Construction Co.

☆☆☆

At a recent banquet where he was honored as guest speaker, **Robert F. Black**, president of **THE WHITE MOTOR CO.**, told 400 Southern California executives that there is need today for enthusiastic leadership in industry to preserve the art of selling and the science of management. White's president, speaking before the fifth annual Executives Banquet at the Huntington Hotel in Pasadena, concluded that in the immediate future there is an astounding amount of business to be had, with more customers than ever before in all history with money to spend.

☆☆☆

At a special directors and stockholders meeting of **COLUMBIA EQUIPMENT CO.**, Portland, Ore., **R. R. Hicks**, general sales manager of the company, was elected to the office of Vice-president. He will continue his sales duties.

363 lin. ft. constr. 30-in. steel cyl. concr. water pipe, modified prestressed.....	26.03	20.00	25.00
Lump sum, 14-in. lin. ft. constr. 30-in. inside diam. steel flanged water pipe having 3/4-in. wall thickness.....	\$1,140	\$1,900	\$1,600
Lump sum, 66 lin. ft. furn. and install 6-in. galv. steel pipe conn. 36-in. diam. steel cyl. concr. pipe to exist 6-in. tee in exist. conc. vault, incl. 6-in. galv. riser.....	\$1,000	615.00	800.00
6 furn. and install 30-in. vert. gate valves, double square bottom, double disc. constr. bell ends, with nonrising stem, spur-gear, with extended grease case, with bypass valve for 150 psi operating pressure.....	\$2,744	\$3,500	\$3,000
2 furn. same as above except flanged ends.....	\$3,003	\$3,600	\$3,300
1 furn. and install 30-in. horizontal gate valve, double square bottom, double disc. constr., bell ends, with nonrising stem, bevel-gear, with extended grease case, with std. bypass valve for 150 psi. operating pressure.....	\$2,895	\$3,490	\$3,400
2 furn. and install 20-in. vert. gate valves, double sq. bottom, double disc. constr. bell ends with nonrising stem, spur-gear with extended grease case, with std. bypass valve for 150 psi. operating pressure....	\$1,235	\$1,640	\$2,000
1 furn. and install 30-in. single gate, flanged ends, iron body bronze-mounted clearway, quiet closing, swing type check valve for 150 psi operating pressure.....	\$2,323	\$2,730	\$2,600
5 constr. and install 30-in. gate jumpers, followed by removal of same; and furn. 30-in. vert. gate valves, double square bottom, double disc. constr. bell ends, with nonrising stem, spur-gear with extended grease case, with std. bypass valve for 150 psi operating pressure, and install same, compl., following removable of 30-in. gate jumpers....	\$2,934	\$4,000	\$3,500
1 constr. and install 30-in. gate jumpers, followed by removal of same; and furn. 30-in. single gate, flanged ends, iron body bronze-mounted, clearway, quiet closing swing type check valve for 150 psi operating pressure, and install same compl., following removal of 30-in. gate jumper.....	\$3,243	\$3,320	\$3,000
Lump sum, furn. and install equip. for the metering of flow at Sta. 94 plus 28, incl. 30-in. Builders VTHS design Venturi tube or equal, Builders' Model MDAUX flow meter or equal; and all piping, conduit, elec. wiring and appurtenances.....	\$6,654	\$9,700	\$9,000
1 furn. and install weatherproof housing to house flow meter furn. for Eta 94 plus 28.....	350.00	590.00	500.00
Per cu. yd. over excav. on account of encountering rock.....	7.50	15.00	8.00
Per cu. yd. over excav. on account of encountering soft, spongy or other unsuitable material.....	5.00	5.00	8.00
Per cu. yd. over excav. on account of change in grade of pipe line.....	5.00	5.00	8.00
Per cu. yd. Class C concr. slab under pipe line.....	30.00	20.00	30.00
Per cu. yd. select matl. mat refill under pipe line.....	5.00	5.00	8.00
Per cu. yd. rock mat refill under pipe line.....	6.00	5.00	8.00
Per cu. yd. concr. constr. of collars, compl. in place.....	40.00	40.00	50.00
80 cu. yd. class C concr. anchor blocks, compl. in place.....	25.00	15.00	25.00
6 cu. yd. class A concr. pedestals for gate valves, compl. in place.....	40.00	40.00	40.00
34 cu. yd. constr. of 2 reinf. concr. vaults housing 30-in. check valve and 30-in. Venturi tube incl. reinf. steel, precast manhole shaft, manhole frame and cover, galv. steps and other appurtenances; all material and labor required for constr. of vaults, compl., to be incl. in the price per cu. yd. of concr.	125.00	100.00	125.00
Remodeling sewer laterals, class A.....	45.00	100.00	50.00
Remodeling sewer laterals, class B.....	45.00	100.00	50.00

Highway and Street...

Montana—Carter and Fallon Counties—State—Grade and Surf.

Northwestern Engineering Co. and Stanley H. Arkwright (joint venturers), Rapid City, South Dakota, were awarded a \$384,724 contract by the Montana State Highway Commission for the gravel surfacing and plant-mix oiling of about 23 mi. of the Ekalala-Baker Road. Unit bids were submitted as follows:

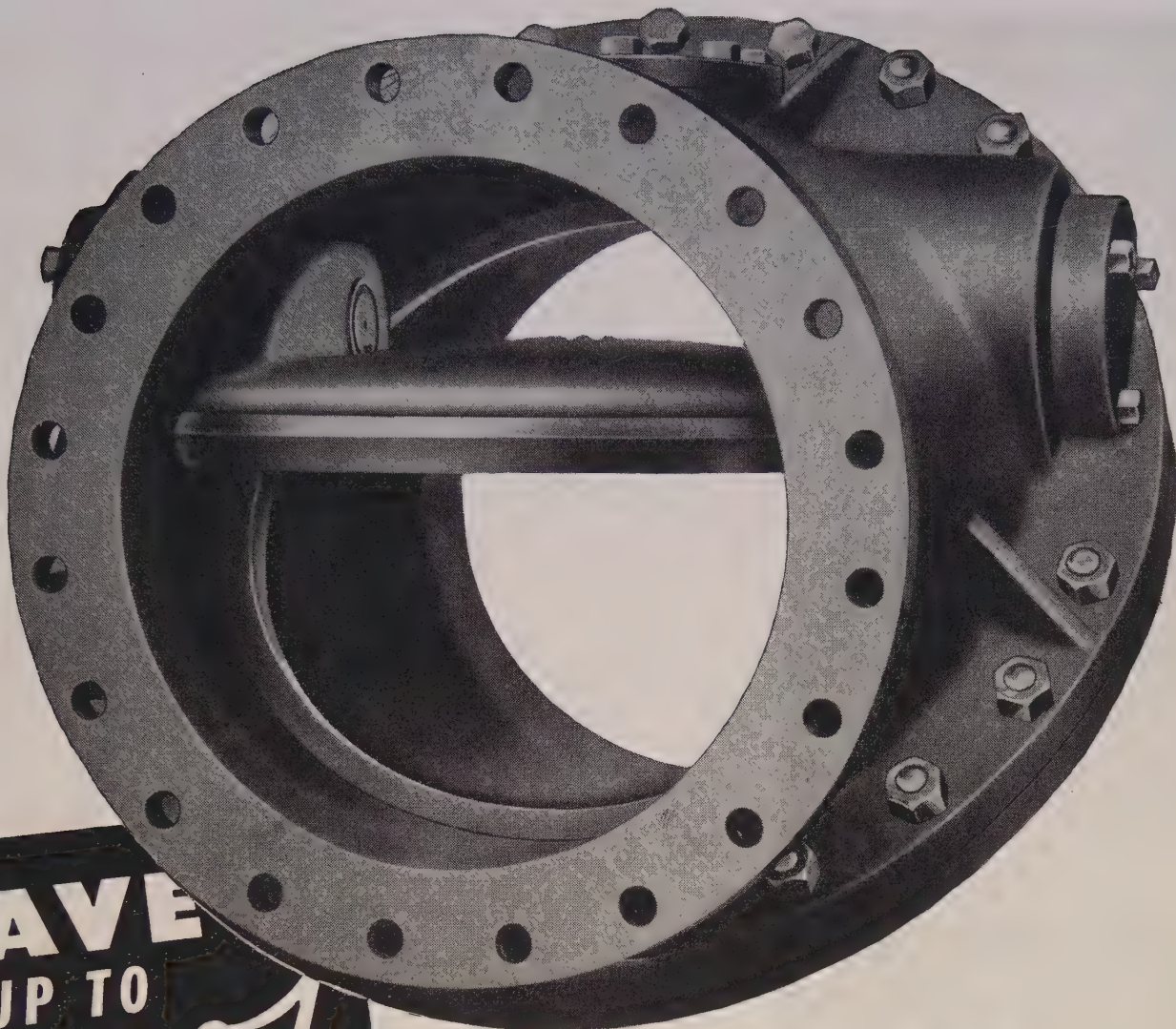
(1) Northwestern Engineering Co. and Stanley H. Arkwright	\$384,724	(5) S. J. Groves Sons Co.	\$392,707				
(2) Peter Kiewit Sons' Co.	388,887	(6) McLaughlin, Inc.	395,742				
(3) Inland Construction Co.	389,617	— Northern Improvement Co.	398,791				
(4) A. Birch & Sons Construction Co.	391,790	— W. H. Noel Co.	405,338				
		(1)	(2)	(3)	(4)	(5)	(6)
57,364 cu. yd. select. bor. base course	1.20	1.00	1.24	1.25	1.00	1.20	
28,683 ton Grade A top course, ¾-in. gr.	2.27	2.00	1.80	1.85	1.95	1.65	
4,512 ton cover course surf. ½-in. gr.	4.58	5.00	4.50	6.00	4.40	6.00	
321 units rolling (pneumatic tired)	8.00	7.00	8.50	8.00	6.65	8.00	
295 units rolling (steel tired)	8.00	9.00	11.50	8.00	7.25	10.00	
2,326 M. gals. watering	2.50	2.00	3.00	3.00	2.75	2.00	
30,195 ton plantmix bit. surfacing	4.38	4.60	4.20	4.30	4.45	4.40	
458,045 gal. SC-6 asp. rd. oil in mix	.125	.16	.16	.15	.175	.17	
75,130 gal. MC-1 asp. rd. oil for pr.	.17	.17	.19	.165	.19	.18	
100,070 gal. SC-6 asp. rd. oil seal	.17	.17	.19	.17	.20	.18	
3 ea. concrete pro. markers	25.00	25.00	20.00	30.00	25.00	25.00	

Utah—Weber County—State—Grade and Surf.

L. T. Johnson Construction Co., Ogden, Utah, was low bidder before the Utah State Road Commission at \$480,191 for construction of a plant-mixed bituminous surfaced road and structures, 6.589 mi., at Uintah, Utah. Unit bids were submitted as follows:

(1) L. T. Johnson Construction Co.....	\$480,191	(6) Reynolds Construction Co.	\$529,593				
(2) Parson & Fife Construction Co.....	497,116	(7) LeGrand Johnson.....	523,478				
(3) Gibbons & Reed Co.....	498,966	(8) A. O. Thorn & Sons Construction					
(4) W. W. Clyde & Co.....	525,494	(9) Strong Co.....	543,507				
(5) R. M. Jensen & Hunsaker Sand & Gravel Co.	528,974	(10) Engineer's estimate	591,251				
		Co.	542,871				
	(1)	(2)	(3)	(4)	(5)	(6)	(10)
31,200 ton plant mixed bitum. surf.....	2.35	2.20	1.90	2.15	2.25	2.15	2.75
346,500 gal. bitum. matl., Type 120-150 pent.....	.115	.115	.10	.11	.125	.12	.13
97,000 gal. bitum. matl., Type MC-1.....	.115	.115	.12	.13	.125	.12	.15
46,500 gal. bitum. matl., Type RC-4.....	.125	.12	.12	.14	.14	.13	.15
1,850 ton cover matl.....	3.50	2.50	3.75	3.00	3.00	3.00	2.50
44,500 ton cr. rock or cr. gravel surf. crse.....	.55	.60	.63	.60	.55	.65	.55
69,500 ton gravel or cr. rock base crse.....	.47	.52	.58	.57	.50	.60	.50
815,500 cu. yd. unclassified excav.....	.16	.18	.18	.19	.195	.18	.25
3,084,000 sta. yd. overhaul, Class "A".....	.01	.01	.01	.012	.0125	.01	.01
52,800 yd. mi. overhaul, Class "B".....	.12	.12	.12	.12	.135	.15	.12
15,900 1,000-gal. watering	1.25	1.50	1.30	1.75	1.00	1.50	2.00
11,100 hr. rolling.....	4.00	4.00	4.50	4.00	4.50	5.00	4.50
400 lin. ft. 10-in. underdrains	1.75	1.00	1.35	1.20	1.50	1.20	1.20
300 lin. ft. 12-in. underdrains	2.00	1.10	1.50	1.45	1.70	1.40	1.30
188 lin. ft. 8-in. C. G. M. pipe	1.50	1.25	1.60	1.40	1.85	1.50	1.50

(Continued on next page)



**SAVE
UP TO
80%
IN HEAD LOSSES**

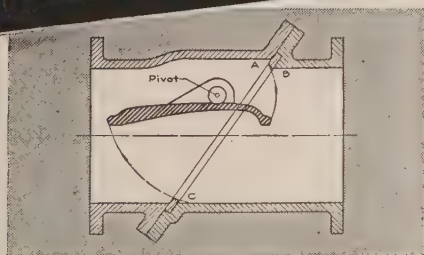
with CHAPMAN **TILTING-DISC CHECK VALVES**

That's right! With Chapman Tilting-Disc Valves, head losses are 65% to 80% lower than for conventional type check valves.

But no wonder head losses are lower. Chapman Check Valves work with . . . not against . . . the stream. The balanced disc rides smoothly on the flow . . . lifts away easily in opening and closes quickly and quietly. There's no slamming to cause destructive pipe line stresses . . . minimum wear on seats, hinge pins and bearings.

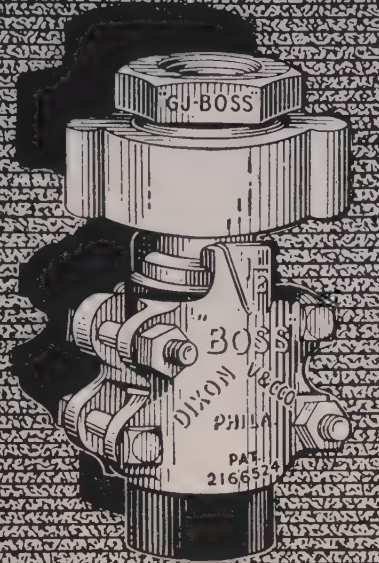
All these features mean lower maintenance costs for you. So write *today* for additional information.

The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

Flawless Quality and Performance



*"GJ-BOSS" Ground joint female coupling Style X-34

The original washerless
hose coupling . . . prod-
uct of true perfection in
design and construction.
Provides unequalled
convenience, durability
and safety on all high or
low pressure lines. Cad-
mium plated—rustproof.

Stocked by Manufacturers and Job-
bers of Mechanical Rubber Goods.

DIXON

VALVE & COUPLING CO.

Main Office and Factory: PHILADELPHIA 22, PA.
BRANCHES: CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON

Reg. U. S. Pat. Off.

16 lin. ft. 12-in. C. G. M. pipe.....	4.00	3.00	2.60	2.50	3.25	2.70	2.20
114 lin. ft. 18-in. C. G. M. pipe (sold'rd jts.)	4.00	4.00	3.35	3.75	4.75	3.70	3.40
32 lin. ft. 42-in. C. G. M. pipe	12.00	12.00	8.75	10.00	10.00	10.20	10.30
79 lin. ft. 72-in. C. G. M. pipe	21.00	24.00	22.00	26.00	30.00	25.00	23.00
590 lin. ft. 12-in. conc. pipe	3.00	2.00	2.60	2.25	2.75	2.25	2.30
100 lin. ft. 15-in. conc. pipe	3.50	2.50	3.00	2.85	3.65	2.80	2.70
1,163 lin. ft. 18-in. conc. pipe	4.50	3.30	3.90	3.55	4.00	3.50	3.50
1,002 lin. ft. 24-in. conc. pipe	5.75	5.00	4.90	4.85	5.00	4.65	4.50
134 lin. ft. 18-in. conc. pipe (extra str.)	5.25	4.25	4.80	4.00	5.00	3.80	4.50
404 lin. ft. 24-in. conc. pipe (extra str.)	6.00	5.25	5.60	6.00	6.00	5.50	5.00
220 lin. ft. 30-in. conc. pipe (extra str.)	8.00	7.00	7.50	8.00	10.50	7.50	6.20
4,190 lin. ft. guard rail	2.75	3.00	2.65	3.00	3.80	3.00	2.50
50 ea. guide posts	6.00	5.00	8.00	5.00	6.00	7.00	5.00
325 cu. yd. gravel backfill	2.00	1.50	1.70	2.00	2.50	3.00	1.25
2,500 cu. yd. excav. for struts,	1.50	.75	1.80	1.50	1.50	2.00	1.50
26.5 cu. yd. conc., Class "A"	50.00	50.00	75.00	65.00	65.00	70.00	60.00
75 cu. yd. conc., Class "B"	50.00	50.00	45.00	65.00	65.00	70.00	50.00
2,450 lb. reinforcing steel	.11	.14	.15	.13	.15	.15	.12
3,015 lb. structural steel	.20	.30	.45	.30	.30	.20	.20
31,950 lin. ft. right-of-way fence, Type "A"....	.20	.22	.26	.22	.25	.30	.25
1,300 lin. ft. right-of-way fence, Type "B"....	.25	.24	.32	.25	.28	.35	.30
20 ea. 14-ft. gates	25.00	30.00	33.00	35.00	32.50	30.00	35.00
2,460 lin. ft. curb, Type 1-C	1.00	1.50	1.85	2.25	2.00	2.00	1.50
156 ea. right-of-way markers	3.00	5.00	5.00	5.00	5.00	6.00	2.50
2 ea. F.A.P. markers	25.00	20.00	12.00	25.00	20.00	20.00	20.00

Colorado—Clear Creek County—Bur. Pub. Roads—Grade and Surf.

Brown Construction Co., Pueblo, Colo., were low bidders at \$591,436 before the Bureau of Public Roads for 7.35 mi. grading and surfacing of Berthoud Route in Arapaho National Forest, Clear Creek County. Unit bids were as follows:

(1) Brown Construction Co.....	\$591,436	(4) Schmidt Construction Co.	\$660,971
(2) Horner & Switzer	642,781	(5) Colorado Construction Co.	696,851
(3) Lowdermilk Bros.	650,705	(6) Engineer's estimate	547,412

	(1)	(2)	(3)	(4)	(5)	(6)
Contingent sum, maintenance	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Contingent sum, miscel. force account work.....	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
48 acre clearing and grubbing.....	500.00	700.00	600.00	\$1,000	\$1,000	400.00
17,000 cu. yd. stripping and storing topsoil.....	1.00	1.00	1.00	.40	.75	.50
274,000 cu. yd. unclassified excav.	1.20	1.31	1.25	1.25	1.50	1.10
3,190 cu. yd. unclassified excav. for struts.....	5.00	5.00	5.00	5.00	5.00	4.00
43,000 cu. yd. unclass. excav. for borrow case 1.....	.50	1.00	.95	1.25	.80	.60
340,000 sta. yd. overhaul (1000 ft. free haul).....	.03	.025	.03	.04	.03	.02
15,000 cu. yd. mi. spec. overhaul of bor. (1000 ft. free haul)	.30	.20	.25	.25	.20	.25
10,000 cu. yd. replacing topsoil	.50	.60	.75	.25	.75	.80
Contingent sum, oblit. of old roadways to be paid for as earned	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000
4,200 unit watering of embankment, Item 29.....	1.00	1.00	1.00	2.00	1.00	2.00
700 unit watering of base course, Item 52A.....	1.00	2.00	1.00	2.00	1.50	2.00
Lump sum, prov. and maint. water plant or plants.....	\$1,000	400.00	250.00	200.00	500.00	\$1,000
1,900 hr. sheepfoot or tamping roller for embank., Item 29	5.00	4.00	5.00	5.00	4.00	6.00
200 hr. power roller for base crse., Item 52A.....	10.00	6.00	7.50	7.00	8.00	6.00
Lump sum, prov. and maint. sheepfoot or tamping roller or rollers on proj.	\$1,000	150.00	500.00	500.00	500.00	\$1,000
Lump sum, prov. and maint. power roller or rollers on proj.	100.00	150.00	500.00	250.00	500.00	\$1,000
23,500 ton cr. gravel or cr. stone base crse., Cl. 2, grading D-1	1.20	1.45	1.30	1.25	1.25	1.40
1,800 ton Type 2 blotter matl. for bit. pres. treat.	4.00	4.00	5.00	1.00	2.00	4.00
45,000 gal. MC cutbk. asph. gd. 0 or 1 for bit. pres. treat.	.15	.18	.19	.20	.16	.16
34,000 gal. MC cutbk. asph. gd. 3 or 4 for bit. pres. treat.						
215 cu. yd. conc. Cl. A (air-ent'd conc. low alkali cement)	50.00	60.00	65.00	60.00	60.00	60.00
23,300 lb. reinforcing steel	.10	.15	.15	.15	.12	.15
500 lb. struct. steel—furn., fab. and erected.....	.20	.15	1.50	.50	.30	.40
860 cu. yd. cement rubble masonry	50.00	35.00	55.00	50.00	35.00	30.00
4,874 lin. ft. 24-in. CGSM culvert pipe	5.00	5.00	6.00	5.50	6.00	5.00
358 lin. ft. 30-in. CGSM culvert pipe	7.00	6.00	7.00	6.50	7.00	6.50
1,000 lin. ft. 6-in. perf. CGSMP underdrain	5.00	3.50	3.00	6.00	5.00	4.00
80 lin. ft. 24-in. perf. CGSMP underdrain	10.00	7.00	8.00	15.00	7.00	6.50
25 sq. yd. grouted rubble gutter	16.00	10.00	10.00	7.50	10.00	6.00
40 ea. conc. maint. marker posts	10.00	15.00	20.00	15.00	15.00	15.00
12,800 lin. ft. barbed wire fence, Type 2.....	.30	.25	.35	.25	.25	.25
3 ea. gates (12-ft.)	30.00	26.00	55.00	50.00	10.00	40.00
230 ea. timber guide posts with warning reflectors (treated)	5.00	4.00	8.00	6.00	5.00	6.00

California—Santa Clara County—State—Grade and Surf.

Eaton & Smith, San Francisco, were low before the California Division of Highways with a bid of \$888,192 for the grading and surfacing with plant-mixed bituminous surfacing on cement-treated base of about 3.3 mi. of the highway between Cape Horn and the Merced County line. Unit bids were submitted as follows:

(1) Eaton & Smith.....	\$ 888,192	— Harms Bros.	1,050,734
(2) Fredrickson & Watson Construction Co.	928,049	— H. Earl Parker, Inc.	1,081,458
(3) Piombo Construction Co. and Clements & Co.	940,266	— Peter Kiewit Sons' Co.	1,103,950
(4) Fredrickson Bros.	941,005	— Parish Bros.	1,110,862
(5) N. M. Ball Sons.	952,815	— Guy F. Atkinson Co.	1,116,198
(6) Westbrook & Pope and United Concrete Pipe Corp.	986,473	— Vinnell Co., Inc.	1,116,829
(7) McNutt Bros.	1,007,335	— A. Teichert & Son, Inc.	1,129,435
		— Frederickson & Kasler	1,236,485
		— Clyde W. Wood, Inc.	1,243,881
		— Macco Corp.	1,277,514

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
125 cu. yd. removing concrete.....	5.00	9.00	8.00	10.00	10.00	12.00	10.00
60 acre clearing and grubbing.....	200.00	307.50	375.00	300.00	400.00	875.00	150.00
750,000 cu. yd. rdwy. excav.	.44	.55	.57	.56	.60	.62	.58
8,000 cu. yd. struc. excav.	5.00	3.20	3.30	3.65	3.00	4.00	4.00
28,750 cu. yd. channel excav.	1.75	1.14	1.60	1.40	1.30	1.20	1.00
1,340 cu. yd. ditch and channel excav.	1.50	2.25	1.25	1.20	2.10	2.00	2.00
3,510 cu. yd. selected rock slope protection.....	1.50	1.70	2.00	.70	1.00	2.50	5.00
2,800,000 sta. yd. overhaul	.005	.009	.008	.01	.005	.006	.01
38,270 tons imported base material	1.00	1.06	1.40	1.20	1.30	.80	1.05
Lump sum, dev. wat. sup. & furn. wat. equip.	\$9,000	\$40,000	\$26,000	\$28,000	\$40,000	\$35,000	\$25,000
35,520 M. gal. applying water.....	1.25	.60	.30	.90	.50	.50	1.50
173 sta. finishing roadway	12.00	18.00	20.00	16.00	10.00	10.00	20.00
106,550 sq. yd. mixing and compacting (cem. tr. base)	.25	.27	.25	.22	.18	.14	.20

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Cancer's danger signals

1. Any sore that does not heal
2. A lump or thickening in the breast or elsewhere
3. Unusual bleeding or discharge
4. Any change in a wart or mole
5. Persistent indigestion or difficulty in swallowing
6. Persistent hoarseness or cough
7. Any change in normal bowel habits

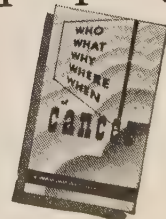
Can be your safety signals

Cancer is curable if discovered early and treated properly

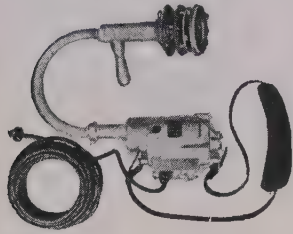
If any of these symptoms appear, see your doctor *at once*.

Write for the booklet about cancer. Just address your request to "CANCER".

AMERICAN CANCER SOCIETY, INC.



"BERG" CONCRETE SURFACER MODEL A



"Berg" equipment is used extensively for surfacing and finishing applications on concrete construction.

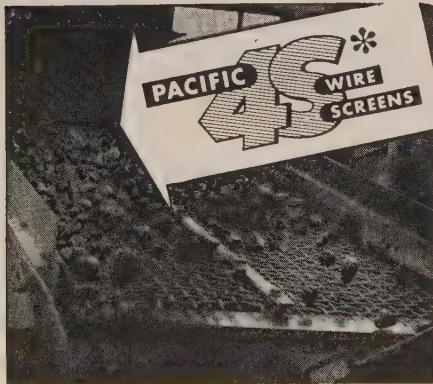
The many "BERG" Models available, permit exact selection for your particular application.

The distinctive "BERG" features give you the kind of results that are realized in better quality work, combined with lower costs.

"BERG" Heads and Attachments are interchangeable, thereby providing adaptability for vibrating, wire brushing, sanding and polishing applications.

THE CONCRETE SURFACING MACHINERY COMPANY

4665 Spring Grove Avenue
Cincinnati 32, Ohio



*4-S-SUPER STRENGTH SPRING STEEL

PRODUCE TONNAGE FAST...WITH 4-S

How much tonnage you get... How FAST you get it... These are important questions. You'll screen more aggregate, and you'll screen it faster if you install Pacific 4-S Wire Screens in your machines. Pacific 4-S Wire Screens are designed right and woven by experts to produce maximum tonnage, now, when you want it. And, you can get 4-S Screens when you want them, too. Fast service. Delivery right away.

See Your Dealer or Write Direct
Be Specific, Say "Pacific" 4-S

"Artisans in Wire Products Since 1891"

PACIFIC WIRE WORKS CO.

KARL H. KAYE, President
Factory and Warehouse
4815 Sixth Ave. South • Seattle 8, Wash.
SPOKANE • PORTLAND • SAN FRANCISCO • LOS ANGELES

10,900 bbl. Portland cem. (cem. tr. base).....	4.00	3.60	3.60	3.75	3.70	3.25	4.00
195 ton asph. emulsion (curing sl. cem. tr. base, pt. bdr. and sl. cts.).....	40.00	35.00	27.00	32.50	30.00	30.00	40.00
31 ton liq. asph., SC-1 (pr. ct. & pen. tr.).....	50.00	35.00	25.00	30.00	26.00	30.00	30.00
6 ton liquid asph., SC-2 (pen. tr.).....	50.00	43.00	40.00	40.00	41.00	30.00	40.00
40 ton sand (pen. tr.).....	6.00	5.70	10.00	6.50	3.50	6.00	6.60
420 ton screenings (sl. ct.).....	5.50	5.70	5.00	6.70	6.00	6.00	7.00
23,410 ton mineral aggregate (P.M.S.).....	5.00	3.10	3.20	2.85	3.30	3.30	3.80
1,170 ton paving asph. (P.M.S.).....	22.50	21.70	20.00	22.00	19.00	20.00	25.00
5,700 lin. ft. raised traffic bars.....	1.25	1.25	.40	1.00	1.10	1.00	1.00
14,100 lin. ft. plant-mixed dikes.....	.15	.17	.15	.12	.15	.25	.15
800 cu. yd. class "A" P.C.C. (structures).....	55.00	50.00	55.00	58.75	56.00	60.00	69.00
74 ea. right-of-way monuments.....	3.50	5.70	5.00	5.60	6.00	6.00	6.00
19 ea. survey monuments.....	30.00	24.40	33.00	28.00	24.00	10.00	20.00
403 lin. ft. metal plate guard railing.....	3.50	3.00	3.00	3.20	3.15	4.00	3.00
190 ea. metal culv. markers and guide posts.....	3.00	4.40	7.00	3.90	3.50	5.00	5.00
6.0 mi. new property fences.....	\$1,500	\$2,500	\$1,300	\$2,250	\$1,500	\$1,400	\$2,500
6 ea. drive gates.....	50.00	55.00	50.00	55.00	48.00	50.00	60.00
656 lin. ft. 12-in. R.C.P. culverts (std. str.).....	2.50	3.00	3.00	2.00	2.20	2.50	1.95
274 lin. ft. 18-in. R.C.P. culverts (std. str.).....	4.00	4.20	4.50	3.20	3.60	3.75	3.05
72 lin. ft. 24-in. R.C.P. culverts (std. str.).....	5.50	5.65	6.00	5.15	5.50	5.50	4.95
1,052 lin. ft. 48-in. R.C.P. culverts (3000-D).....	13.00	18.25	20.50	18.50	17.00	20.00	17.95
276 lin. ft. 60-in. R.C.P. culverts (2500-D).....	20.00	25.00	28.00	23.80	26.00	25.00	24.30
184 lin. ft. 72-in. R.C.P. culverts (std. str.).....	27.50	26.60	27.50	24.50	27.00	28.00	25.65
264 lin. ft. 18-in. C.M.P. (16 ga.).....	3.50	2.70	2.80	2.95	3.20	3.00	2.60
476 lin. ft. 24-in. C.M.P. (12 ga.).....	6.00	5.40	5.80	5.50	6.00	6.00	5.20
710 lin. ft. 24-in. C.M.P. (14 ga.).....	4.75	4.40	4.50	4.30	5.00	4.50	4.00
626 lin. ft. 6-in. perf. metal pipe underdr.	2.50	1.22	1.10	2.00	1.30	1.30	1.25
80 cu. yd. filter material (underdr.).....	6.50	5.70	2.75	7.85	3.50	10.00	9.00
210 lin. ft. 6-in. welded steel pipe.....	2.00	1.40	1.40	1.15	1.30	2.00	1.10
398 lin. ft. 8-in. C.M.P. downdr. (16 ga.).....	1.80	1.90	2.00	1.75	1.80	2.00	1.65
4 ea. spillway assemblies.....	35.00	45.00	50.00	33.50	27.00	40.00	25.00
18 ea. pipe anchors.....	17.50	21.00	20.00	22.40	15.00	20.00	15.00
44 lin. ft. salv. exist. spillway assembly down drains.....	1.50	1.15	2.00	1.00	1.00	1.00	.70
2 ea. salv. exist. spillway assemblies.....	12.50	11.00	7.00	10.00	5.00	10.00	10.00
44 lin. ft. relaying salv. spillway assemb. down drains.....	1.00	1.15	1.00	1.00	1.00	1.00	.40
2 ea. installing salv. spillway assemblies.....	17.50	11.00	25.00	15.00	10.00	15.00	10.00
101,000 lb. bar reinforcing steel.....	.09	.09	.10	.09	.09	.10	.11
1,550 lb. misc. iron and steel.....	.35	.30	.30	.30	.25	.40	.50
135 lin. ft. rail steel (debris rack).....	3.00	2.00	5.00	1.70	1.50	2.00	4.00
2,000 sq. yd. obliterating detour and exist. rd.	.25	.08	.20	.10	.20	.15	.25

Oregon—Gilliam County—State—Grade and Surf.

A. H. Saxton & Sons, Corvallis, Ore., with a bid of \$386,701, was low before the Oregon State Highway Department for the grading and bituminous macadam surfacing of approximately 6 mi. of the Columbia River Highway from Squally Hook to Quinton. Unit bids were submitted as follows:

(1) A. H. Saxton & Sons.....	\$386,701	— Rogers Construction Co.....	\$492,423
(2) Del R. Beebe Construction Co.....	395,287	— J. N. & M. J. Conley.....	494,676
(3) Colonial Construction Co.....	416,753	— Leonard & Slate Oregon, Ltd.....	499,194
(4) McNutt Bros.....	447,903	— E. C. Hall Co.....	512,368
(5) Carl M. Halverson.....	479,547	— E. L. Gates & Co., Inc.....	596,337
(6) Berke Bros.....	489,393	— Natt McDougall Co.....	551,916

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, clearing and grubbing.....	\$13,000	\$30,000	\$15,000	\$6,000	\$2,000	\$18,000
200 cu. yd. structural excav., unclassified.....	4.00	3.75	2.50	5.00	7.00	3.50
100 cu. yd. trench excav., unclassified.....	1.00	3.75	1.00	2.00	3.00	3.50
68,000 cu. yd. gen. excav., locations "A", unclassified.....	.57	.45	.35	.45	.90	.34
205,000 cu. yd. gen. excav., locations "B", unclassified.....	.57	.45	.73	.81	.90	1.05
778,000 yd. sta. short overhaul.....	.01	.015	.01	.02	.02	.02
20,000 cu. yd. sta. long overhaul.....	.40	.40	.50	.50	.60	.50
5.88 mi. finishing roadbed and slopes.....	300.00	550.00	500.00	500.00	500.00	600.00
12,000 lin. ft. rounding cutbanks.....	.15	.25	.15	.20	.15	.15
830 lin. ft. 18-in. conc. pipe.....	3.50	3.00	3.50	2.95	3.50	3.00
230 lin. ft. 24-in. conc. pipe.....	5.00	4.25	4.50	4.20	4.50	4.00
60 lin. ft. 36-in. conc. pipe.....	10.00	7.30	7.80	7.45	8.00	8.00
460 lin. ft. salvaging culvert pipe.....	2.00	2.50	1.00	2.00	1.50	2.00
200 cu. yd. excav. for structs.....	5.00	5.00	3.00	7.00	7.00	3.50
10 cu. yd. struct. excav. below elevations shown.....	10.00	10.00	10.00	15.00	7.00	15.00
124 cu. yd. Class "A" concrete.....	50.00	70.00	55.00	70.00	70.00	70.00
17,600 lb. metal reinforcement.....	.11	.14	.10	.14	.11	.12
50 hrs. reshaping slopes with bulldozer.....	8.00	10.00	10.00	15.00	12.00	10.00
25 hrs. reshaping slopes with blade grader.....	7.00	9.00	8.00	10.00	11.00	9.00
3,700 lin. ft. salvaging cable guard fence.....	.50	.30	.75	.50	.40	.50
6,000 lin. ft. metal guard rail.....	2.35	2.40	2.50	2.25	3.00	3.00
140 only concrete sight posts.....	8.00	10.00	9.00	10.00	9.00	10.00
11,000 cu. yd. reject matl. in cushion course.....	1.10	.80	1.00	1.15	1.50	.87
28,000 cu. yd. 4 1/2-in. - 2-in. rock in base.....	1.70	1.85	1.80	1.85	1.50	1.77
20,000 cu. yd. 3/4-in. - 0-in. rock in base and shoulders.....	1.80	2.09	1.80	2.00	1.50	1.82
1,060 cu. yd. 3/4-in. - 1/2-in. crushed rock in stockpile.....	1.80	1.55	1.90	1.40	1.50	1.50
540 cu. yd. 1/2-in. - 3/4-in. crushed rock in stockpile.....	1.80	1.55	1.90	1.40	1.50	1.50
400 cu. yd. 1/4-in. - 0-in. crushed rock in stockpile.....	1.80	1.55	1.90	1.40	1.50	1.50
1,900 M. gals. sprinkling.....	2.75	3.00	2.50	2.50	2.50	3.00
11 ac. preparing soil and seeding.....	70.00	700.00	100.00	500.00	300.00	300.00
40 tons emulsified asphalt in slope oiling.....	50.00	55.00	39.60	50.00	48.00	50.00
9,200 cu. yd. furn. and placing aggregates.....	200.00	220.00	240.00	100.00	200.00	100.00
120 tons furn. and placing RC-3 asph. in binder crse.....	3.20	3.00	3.50	3.00	3.10	2.75
630 tons furn. and placing 121-150 asphalt.....	40.00	44.00	40.00	42.00	38.00	38.00
	36.00	40.00	38.50	40.00	37.00	36.00

California—San Diego County—State—Culvert

Griffith Co., Los Angeles, bidding \$37,713, was low before the California Division of Highways for construction of a quadruple 72-in. concrete pipe culvert on Mission Valley Road near the intersection of Alvarado Canyon Road and Fairmount. Unit bids were submitted as follows:

(1) Griffith Co.....	\$37,713	(6) N. M. Saliba Co.....	\$46,334
(2) Pace Construction Co.....	39,511	— R. E. Hazard.....	48,485
(3) Johnson-Western Gunite Corp.....	41,546	— E. C. Young & Co.....	48,736
(4) Daley Corp.....	45,121	— V. R. Dennis Construction Co.....	51,946
(5) Thomas Construction Co.....	45,537	— Walter H. Barber.....	52,557

	(1)	(2)	(3)	(4)	(5)	(6)
3,600 cu. yd. struct. excav.....	1.45	2.25	1.85	2.20	1.60	2.50
1,100 cu. yd. ditch and chan. excav.....	2.00	1.00	.46	1.75	1.95	2.00
120 cu. yd. class "A" P.C.C. (struct.).....	36.00	45.00	55.00	65.00	53.00	50.00
5,300 sq. ft. conc. ditch lining.....	.45	.35	.29	.50	.52	.50
600 sq. yd. mesh reinf.....	.65	.65	.50	.60	.75	.50
8,200 lb. bar reinf. steel.....	.14	.13	.14	.13	.13	.12
900 lin. ft. 72-in. R.C.P. (extra str.).....	24.50	24.00	27.55	26.00	30.00	28.00

NEW EQUIPMENT

MORE COMPLETE INFORMATION of any of the new products or equipment briefly described on the following pages may be had by sending your request to Equipment Service, Western Construction News, 609 Mission Street, San Francisco 5, Calif. For quicker service, please designate the item by number.

101

Crane Blocks

Manufacturer: American Hoist and Derrick Co., St. Paul, Minn.

Equipment: American Lo-Head crane blocks in capacities from 10 to 50 tons.

Features claimed: The new blocks, with shorter overall length, permit $1\frac{1}{2}$ to 2 ft. higher lifts without lengthening the boom. Forged hooks operate on Timken tapered roller bearings and cast steel sheaves are equipped with Hyatt Hi-Load bearings. Lubrication is necessary only once each 2,000 hours. Alemite fittings are provided for standard grease gun use.

102

Rubber-Mounted Crane-Excavator

Manufacturer: Bucyrus-Erie Co., South Milwaukee, Wisc.

Equipment: The 22-B transit crane.

Features claimed: High speed mobility and a sturdy working base are assured in the newly designed transit crane wheel mounting. The 142-hp. Bucyrus-Erie mounting is built by Sterling for exclusive use with the 22-B unit. Wheelbase of the new mounting is 181 in. and the overall width is 8 ft. The frame is of alloy welded steel with bumper and outrigger brackets welded integrally. Two double box outriggers provide additional support on the

job. Air brakes, optional hydraulic booster steering, and 12-speed transmission are other features of the wheel mounting. Removable inserts may be used to increase the standard 30-ft. boom to an 80-ft. boom in lifting crane service. For traveling, long booms are quickly folded with special equipment. A full range of front end equipment is available for the new crane. It may be converted in the field for shovel, dragline, dragshovel, clamshell, or crane operation. In excavator service, the buckets and dippers are of $\frac{3}{4}$ -cu. yd. capacity.

104

Plastic Street Markers

Manufacturer: Beaman Plastic Products Co., Portland, Ore.

Equipment: Plastic markers that are visible in all types of weather to replace painted street markers.

Features claimed: The easily applied plastic markers, molded in $4\frac{1}{2}$ -in. disks, need only a minimum of maintenance after being installed for four to six years. Only two men can install 100 in an hour. The markers are designed to withstand the severest road conditions. The markers are adaptable to both concrete and asphalt pavement, and are applied swiftly by means of a special adhesive and an easily installed metal pin. On asphalt, they are applied with hot mastic adhesive at intervals,

103

Belt-Type Loader

Manufacturer: J. D. Adams Manufacturing Co., Indianapolis, Ind.

Equipment: The Adams Traveler, a new self-propelled, self-feed belt-type loader.

Features claimed: The machine is designed to pick up and load into trucks any type of material which can be windrowed and which will pass up a conveyor belt—this includes dirt, sod, sand, gravel, oil-mix, surplus scarified material, snow, etc. A revolving feeder, with 12 curved and beveled edge blades, moves the material up a metal pan and places it on the revolving conveyor belt. The feeder is hinged at the rear and is free to float so as to adapt itself readily

to any size windrow. The gathering molds to the side of the feeder are adjustable to windrow width so as to keep the material flowing readily in a continuous stream through the feeder with the least possible friction and power loss. The rear section of the conveyor is adjustable so as to provide a wide range of discharge heights. Another feature is the centrally located operator's cab atop the machine which keeps the operator above the dust area and affords good visibility in all directions. The Traveler is powered by an International tractor-type gasoline engine which furnishes power for operating the feeder and conveyor as well as propelling the machine. An auxiliary transmission is used which permits operating travel speeds as low as .42 m.p.h. Top travel speed is 26.4 m.p.h.



twisted firmly into the mastic and secured by driving a 2-in. pin through the marker into the asphalt. No drilling is necessary. Cars may run over them immediately after they have been installed.

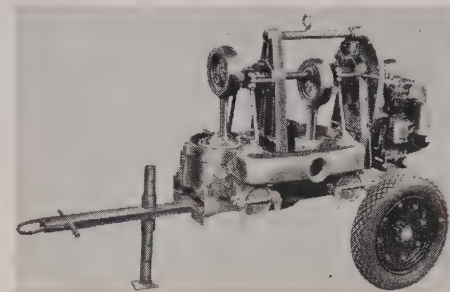
105

Double Diaphragm Pump

Manufacturer: Novo Engine Co., Lansing, Mich.

Equipment: Pump for handling muddy or sand- and debris-laden water.

Features claimed: Engineering, design and construction of the new pump closely parallel that of the company's well-known



single diaphragm model which has proven so successful in de-watering operations handled by public utilities maintenance and construction crews. However, since one diaphragm of the new pump is always pumping while the other is discharging, there is a constant flow which doubles the new pump's capacity.

106

Portable Secondary Crushing Plant

Manufacturer: Lippmann Engineering Works, Milwaukee, Wis.

Equipment: Lightweight crushing plant.

Features claimed: Mounting a 24-in. wide x 16-ft. feed conveyor with hopper,



a 2 ft. x 8 ft. $2\frac{1}{2}$ deck vibrating screen, a 16-in. wide x 16-in. diameter roll size roll crusher, a UD 9 International Diesel power unit, two 18-in. x 11-ft. folding discharge conveyors, a 24-in. x $2\frac{1}{2}$ -ft. cross conveyor, and an 18-in. x 25-ft. return conveyor, this plant has an overall length of 36 ft., 2 in., overall height of 11 ft., 1 in., overall operating width of 24 ft., and overall width in transit of 8 ft. The power unit develops 55 h.p., and is equipped with electric starting equipment. The plant illustrated is being used in the Philippine Islands because of its light weight of 25,000 lb., and because it is capable of turning out more than sufficient capacities to meet the needs of the Philippine Department of Roads.

107

Plaster and Mortar Mixer

Manufacturer: Muller Machinery Co., Inc., Metuchen, N. J.

Equipment: Three-cu. ft. mixer.

Features claimed: Although designed particularly for the small mason contractor, the unit is convenient for use on larger jobs where the mixing operation is decentralized to save time in handling mixed materials.

Its low charging height of 32 in. and width of 29½ in. make it particularly convenient for inside use, going through a 30-in. doorway without altering wheels. The unit is powered by a Model 9-R-6 Briggs and Stratton Air-Cooled Engine and it is driven through a roller chain and machine cut gears.

108

Warning Device for Booms

Manufacturer: Electro-Alarm Sales Co., Omaha, Neb.

Equipment: Proximity warning device that sounds a loud warning signal each time the boom swings into the vicinity of danger from power lines.

Features claimed: Once turned on, the electronic safety device works automatically. At 75 ft., it can detect and warn the operator of danger in the 10,000-volt range. It is sensitive to voltages from 110 volts up and allows proximity warnings from 4 to 200 ft. Rain, ice and sleet do not interfere with its use. The device fits any rig.

109

New TelSmith Gyrasphere Crushers

Manufacturer: Smith Engineering Works, Milwaukee, Wis.

Equipment: The Style S Standard Gyrasphere and the Style FC Fine Crushing Gyrasphere.

Features claimed: In the new Style S Standard Gyrasphere, larger roller-bearing thrust bearings are now located at the top of the eccentric and transmit crushing pressures from the bottom of the head directly into the main frame. A longer crushing stroke gives greater capacity. The eccentric bearings have more bearing area

in the upper zone of greatest crushing pressures. Longer springs are used, to pass larger pieces of tramp iron. The Main Drive Gear is now located at the bottom of the eccentric instead of the top, assuring more perfect and more permanent alignment of gears and longer life for these parts. The new model is more accessible for maintenance purposes. The Style S Standard Gyrasphere is available in the 24-, 36- and 48-in. sizes with either coarse or medium bowl.

The new Style FC Crushing Gyrasphere has the same structural improvements as the Style S, plus several additional fine crushing features. It comes equipped with a new Feed Distributor, for even feeding and more uniform product. It has more springs to handle greater crushing pressures. The Style FC has a different shape of mantle and concave with a longer parallel crushing zone to give a finer product. New Gun-Lock type mantle and concave holding devices are automatically self-tightening and make these parts easier to change. The Style FC Fine Crushing Gyrasphere Crusher also is available in the 24-, 36- and 48-in. sizes with either medium or fine bowls.

110

Snow Melting Chemical Powder

Manufacturer: The Chem Industrial Co., Cleveland, Ohio.

Equipment: Melt, an ice thawing and snow melting powder.

Features claimed: Melt, claimed by the manufacturer to be 99% active, is reputed to eliminate the necessity for shoveling snow or chipping ice. Twenty-five-lb. capacities are now being shipped in sturdy galvanized pails, double-sealed against

moisture and leakage. In addition to the 25-lb. pails, it is available in 100 and 200-lb. drums and in ton lots.

111

Crawler-Mounted Excavator

Manufacturer: Wayne Crane Division, American Steel Dredge Co., Fort Wayne, Ind.

Equipment: Model 66, ½-yd. excavator with new crawler assembly.

Features claimed: The excavator, weighing 30,398 lb., as a trench hoe (illustrated) is easily convertible to shovel, dragline, clamshell and a magnet or 7.5-ton utility crane. The new crawler assembly is



powered through direct drive propeller shaft assembly from the new "direct power flow" transmission. This transmission is remotely located from the power unit and is connected by a right angle drive and universal drive shaft. This design practically eliminates noise and backlash common to chain and gear drives. Bearing length of the crawler is 8 ft., 5 in., with a width of 8 ft., which gives stability for 360-deg. operation. The new machine has an all-welded chassis and travels, lifts, booms and swings simultaneously or independently. The swing speed is 6.2 r.p.m. Standard power unit is a 6-cylinder gasoline engine which develops 62 h.p. at 1800 r.p.m.

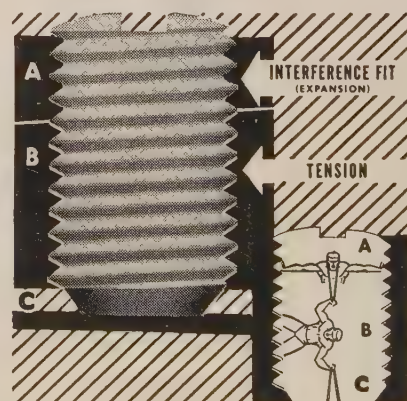
112

Self-Locking Set Screw

Manufacturer: Set Screw & Mfg. Co., Bartlett, Ill.

Equipment: Screw that does not require any lock nuts, wires, impinging locking screws, deformed or riveted threads.

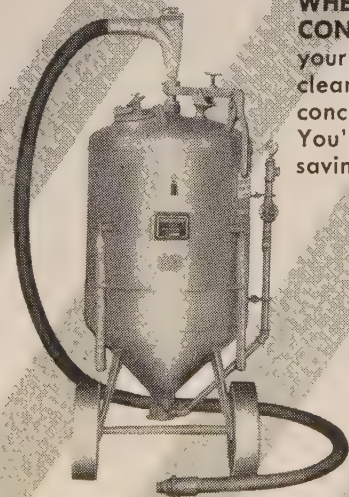
Features claimed: The Zip-Grip self-locking screw is specifically designed for



set screw applications in which excessive vibration is a factor, and for regulating and adjustment applications, in which instantaneous locking at a precise point is desired. As the cutaway illustration shows, the

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Fresno, California

lower part of the Zip-Grip screw (B), which enters the hole first, has a standard thread, the same as any other screw. The upper section of the screw (A), designated as the "activating area," has a larger pitch diameter of the thread section which creates an interference fit or expansion effect against the thread flanks. This results in a tension or opposed-force action, causing the thread section of the upper part to be drawn downward and that of the lower part to be drawn upward, in the direction of the screw's locking action against the shaft. Available in all metals, with any type head.

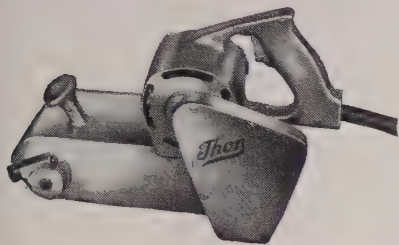
113

Electric Belt Sander

Manufacturer: Independent Pneumatic Tool Co., Aurora, Ill.

Equipment: Silver Line Belt Sanders.

Features claimed: The new sander, for sanding wood, metal, and stone with endless sanding belts $4\frac{1}{2}$ in. wide by 26 in.



long, features a direct spur gear drive, rapid belt change device, and a new heat radiating system to increase belt life. The system consists of open-end construction, with belt motion creating air currents to blow generated heat away, and heavy-section aluminum fins to conduct heat to a flat radiating surface that forms the top housing of the tool. A simplified tracking arrangement permits easy centering of the belt on roller pulleys, and a special internal device prevents belts from wearing away the inner surfaces of the housings.

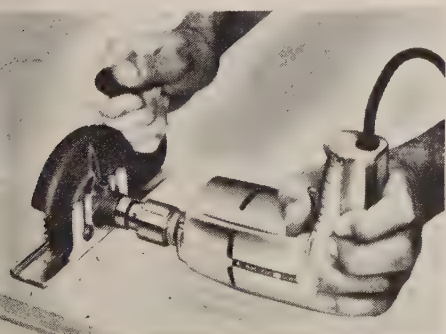
114

Portable Power Saw

Manufacturer: Portable Electric Tools, Inc., Chicago, Ill.

Equipment: Portable power saw that uses any $\frac{1}{4}$ -in. electric drill for power.

Features claimed: One end of the saw arbor has a $\frac{1}{2}$ -in. shank that fits into the drill chuck. The extremely light weight



and small size make it easy and safe for any trimming, rip and cross-cut sawing, and dado cutting up to its rated capacity. Driven direct from the electric drill, there are no gears or other connecting mechanisms. A one-piece, cast aluminum alloy frame contains the saw blade guard, bearing for saw arbor and full-sized, comfortable handle.



Greater Time and Labor Savings, Greater Efficiency and Reliability Than Has Ever Before Been Provided In Any Concrete Vibrator for General Construction

Reaches Every Point in a 100' Circle!

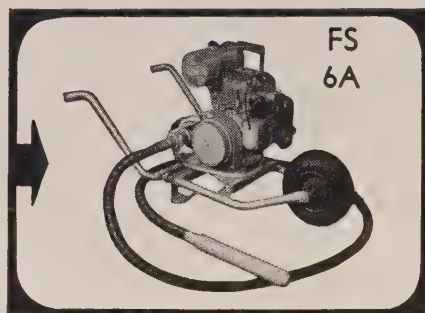
Its 50' hose eliminates many changes of location, saves time and makes the hard-to-reach places easily accessible.

7 HP ENGINE — Loads of power for continuous operation, day in and day out. 4,000 to 7,000 VPM (instantly variable) with frequency and amplitude carefully balanced to give perfect compaction under all conditions. $2\frac{3}{4}$ " vibrator head.

NO DAILY MAINTENANCE. All vibrator parts operate in stream of oil under pressure! **QUICKLY CONVERTED TO WET OR DRY GRINDING.** This machine will save its cost in short order.

FLEXIBLE-SHAFT VIBRATOR

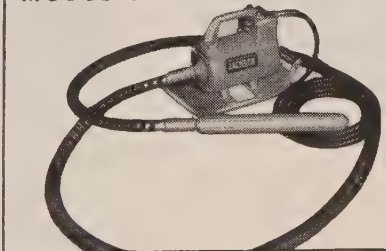
Model FS-6A is the finest of the engine-driven, flexible-shaft type vibrators. Ample power (4 HP). Available with 3 heads for thick or thin sections. Shafting furnished in 7' to 14' lengths up to 28'. Grinding and other attachments. An excellent performer as proven on thousands of jobs.



FLEXIBLE-SHAFT, ELECTRIC VIBRATOR

2½ HP motor. Plenty of power to handle the stiffest mixes with the maximum length of shaft (28'). Operates from light socket, 115 volt, single phase AC or DC. 8,000 to 10,000 VPM. Available with 3 vibrator heads and any length of shaft up to 28'; attachments for quick conversion to wet or dry concrete rubbing. Highly convenient, weighs only 50 lbs.

MODEL FS-150A



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thin sections to mass construction — Highway, airport and municipal paving. Soil compaction. Portable Power Plants.

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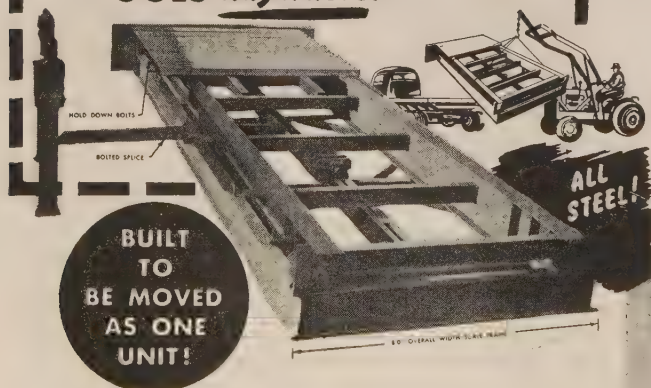
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30-Ton 24' x 9'
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platform sizes built
to suit.

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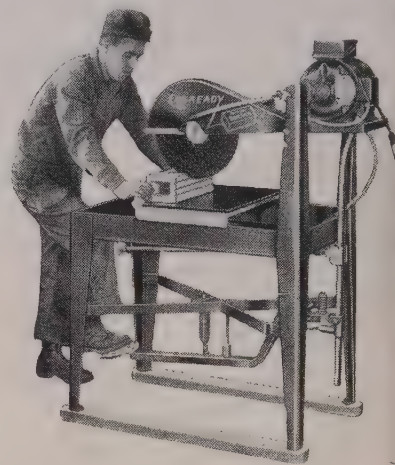
115

Masonry Saw

Manufacturer: Eveready Briksaw Co., Chicago, Ill.

Equipment: Saw with instant portability for both wet and dry cutting.

Features claimed: In 4 sec., with the patented "Adjusta-Height" feature, the Cutting Head height of the saw can be adjusted for such widely different size materials as quarry tile, brick, partition tile and concrete block. "Toe-Matic" control enables the operator to swing the cutting head in an upward or downward arc of 10 in. instantly. Combination of the two controls lets the operator slice any kind of cut in any kind or size masonry material as fast as the pieces hit the saw. The one-piece cutting head can be removed completely in 21 sec. from the saw frame without tools, making for fast and easy portability. An automatic blade pressure spring adjusts the blade pressure to the hardness or softness of the material.



116

Braided Air Hose

Manufacturer: The B. F. Goodrich Co., Akron, Ohio.

Equipment: Hose designed especially for use as an air line in paint spray equipment.

Features claimed: The hose is light and flexible, qualities particularly desirable in reducing drag on the spray operator. Made with a red cover of tough stock, the smooth molded finish reduces

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tendency to accumulate paint and dirt. Strong cotton reinforcement and a special air hose tube form a balanced construction suitable for working pressures up to 150 lb. The one braided type is made in three sizes— $\frac{1}{2}$ in., $\frac{5}{16}$ in., and $\frac{3}{8}$ in. The two-braid is in $\frac{7}{16}$ -in. size.

117

Bituminous Patching Tamper

Manufacturer: Wayer Impactor Sales Co., Columbus, Ohio.
Equipment: Model 25-C Wayer Impactor for super-tamping



bituminous and dry concrete pavement patching, floor base and earth.

Features claimed: Tamping impact has been increased to 1250 ft. lb. delivered at a speed of 1900 blows per minute. New self-priming, constant speed carburetor, flexible break-proof gas line, heavy-duty fuel tank, anchored bolts and screws, long-life shock absorbers and more efficient heating of the tamping - finishing plate are now provided. The machine is self-propelled and capable of tamping and smoothly finishing 60 to 80 sq. ft. per

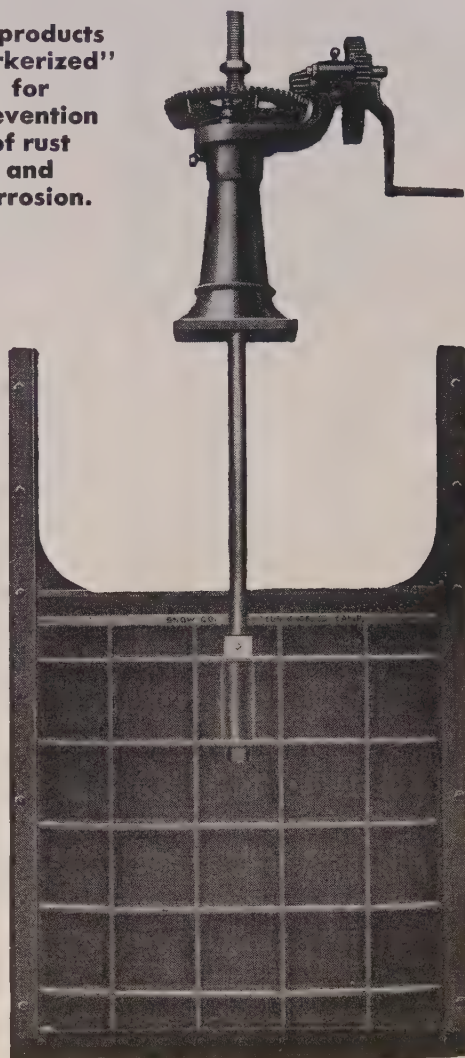
minute. By power impaction, it is said to produce greater weight and density in patch materials than is obtained with a 10-ton roller. Compact size and an overall weight of 240 lb. permit the Impactor to be carried in light trucks.

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CONCRETE TRANSPORT MIXER CO.

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Hydraulic Control for Snowplows

Manufacturer: National Truck Equipment Co., Waukesha, Wis.

Equipment: Snowplow controls using a compact hydraulic pump with its own all-metal clutch.

Features claimed: The pump, called the Hydra-Clutch Pump, operates only when the power is needed. Only one finger-tip

control knob on the dash raises the plow (engaging the clutch), holds the plow and lowers the plow (operating the slide valve). The National Snowplow Kit controls the movements of the snowplow with the least amount of effort whether the truck is moving rapidly or slowly, without using the truck clutch. It is claimed that snowplows can be raised 10 times faster and 100 times easier.

119

Road-Shoulder Maintainer

Manufacturer: Lull Mfg. Co., Minneapolis, Minn.

Equipment: Tool designed for maintenance of road shoulders beyond the pavement and equipped with a unique automatic windrow eliminator.

Features claimed: The Lull Maintainer should be welcomed by highway officials as an efficient tool for a vital job. It is a "one pass" machine. The front moldboard reaches to the outer edge of the shoulder and cuts, blades and rolls the material inward, toward the pavement, cutting high spots and filling all depressions and low spots. Then the side and transfer moldboards, running parallel to the concrete slab, deliver the excess material to a rear spreading moldboard, which is positioned at an angle opposite to the front moldboard. The rear moldboard, equipped with the automatic windrow eliminator, distributes the remaining material evenly, and free of windrows. Controls are effected by hydraulic power through a self-contained, self-powered hydraulic system mounted on the maintainer. Blades may be set as required, and positive hydraulic down-pressure applied as deemed necessary. The entire machine, except the wheels, is raised

and lowered by one master cylinder without affecting any of the independent blade adjustments.

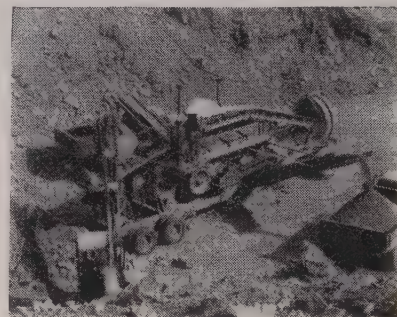
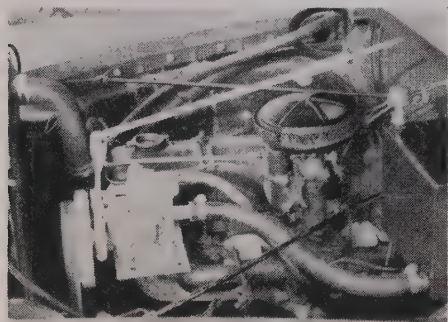
120

Crushing and Screening Plant

Manufacturer: Iowa Manufacturing Co., Cedar Rapids, Iowa.

Equipment: Double-duty plant that will replace two single units.

Features claimed: Designed specifically for the aglime, chip and road stone fields, the "Rock-It" produces crushed stone or aglime, or a percentage of both, in one operation. Capacities range from 60 to 80



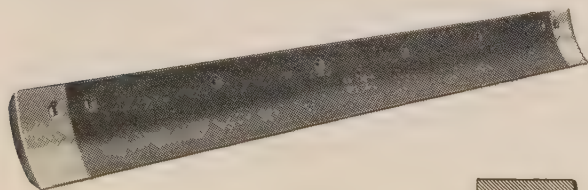
tons per hour. Simple design and compact construction make the "Rock-It" a highly portable plant. The only parts to remove to meet highway transportation requirements are the charging hopper and delivery conveyors. Other features include: Accurate gradation of the finished product, centralized controls, low feeding height for shovel feed, and anti-friction construction throughout. The plant is made up of standard Cedarapids units.



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WASHINGTON
Seattle—Nelson Truck Equipment Co.
Spokane—Andrews Equipment Service

LITERATURE FROM MANUFACTURERS...

Copies of the bulletins and catalogs described in this column may be had by addressing a request to the Western Construction News, 609 Mission Street, San Francisco 5, California.

121

CRUSHING AND SCREENING PLANT—A new 4-page bulletin describing the dual-purpose of the Cedarapids "Rock-It" crushing and screening plant has been issued by **Iowa Manufacturing Co.**, Cedar Rapids, Iowa. The plant's operation in producing aglime or road rock, or both, in a single operation, is illustrated by a diagrammatic flow sheet. Dimensions, specifications and complete descriptions of each standard Cedarapids unit included in the machine are contained in the bulletin.

122

NEW WATER SOFTENER—**Worthington Pump and Machinery Corp.**, Harrison, N. J., has published a 16-page booklet containing a complete description and flow diagram for a new cold process slurry type precipitating water softener and coagulator employing hydraulic energy for mixing the applied chemicals with previously formed precipitate, thus obtaining optimum flocculation without the use of submerged mechanical moving parts within the softener. According to the booklet, complimentary recirculation of the treated water maintains a uniform depth of slurry bed independent of load demand, and density of the slurry bed is automatically and proportionately maintained. Further, when filters

are used for final clarification, a washer reclamation compartment is incorporated to enable the filters to be economically backwashed with clean, chemically inert water without imposing increased flow rates through the softener.

123

SIZING OF EXCAVATORS AND HAULING EQUIPMENT—A 24-page bulletin dealing with the proper sizing of excavators and hauling equipment has been published by the **Power Crane and Shovel Association**, New York City. The bulletin is intended to round out the subject of functional design, job application, and ownership and operating costs previously covered in the first two of a series of technical bulletins. It deals with the problems of correctly sizing the excavator and hauling equipment and proper synchronization of hauling fleet with excavator to obtain maximum output and minimum delay in job operations. The study analyzes various factors affecting efficient operation on a job, such as type of material excavated, volume of work, spotting units at the shovel, distance of haul and hauling cycles with practical suggestions on improving overall output. Performance tables in relation to factors involved are given in the text and formulae upon which these tables are based, are developed in an appendix to the bulletin. Copies of the pamphlet, Technical Bulletin No. 3, may be obtained from the Association for 50 cents each, and will be furnished to engineering schools and colleges without charge.

124

DIESEL ENGINES—Two new bulletins containing complete specifications of

all automotive and industrial models of HR-600 and HRS-600 Cummins Diesels have been announced by the **Cummins Engine Co., Inc.**, Columbus, Ind. Each bulletin includes general specifications, a list of standard equipment for each model, together with optional equipment. The bulletins are illustrated with installation drawings and photographs of the various models, plus drawings illustrating torque, horsepower and fuel consumption curves.

125

ADAMS ROTARY SNOW PLOW—**J. D. Adams Manufacturing Co.**, Indianapolis, Ind., has published a catalog illustrating and describing the Adams Rotary Snow Plow which is designed to attach to the front end of any current Adams heavy-duty motor grader. The plow cuts 9 ft. wide and a revolving rake which breaks snow up in front of the plow may be raised to a height of 8 ft. Independently driven by engines developing 180 h.p., the plow is said to have greater capacity than most truck mounted rotaries in general use. The motor grader serves only to carry and propel the plow into the snow. The idea of mounting a full-fledged, large capacity rotary snow plow on the front end of a motor grader was introduced by Adams last year and its application proved highly successful in the Western blizzard of last winter.

126

FORM CLAMPS AND THEIR ACCESSORIES—**Williams Form Engineering Corp.**, Grand Rapids, Mich., has published a leaflet entitled "Suggestions for Using Williams' Form Clamps and Their Accessories." Discussed in the leaflet are the spacing of walers vertical, spacing

WITH TIRE TREAD SOLE

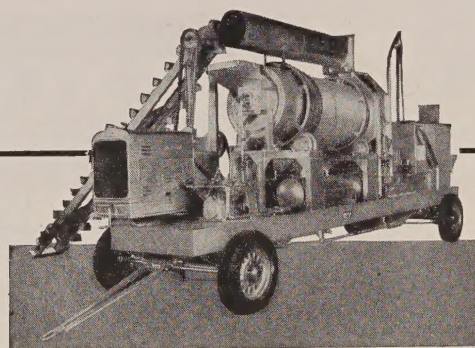
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Almost any type of pavement can be repaired economically and efficiently with a White Portable Asphalt Plant. Asphalt, brick, concrete, macadam, can be easily patched or resurfaced.

It will match any bituminous surface. Produces for immediate hot application or makes mix for deferred cold laying.

Contains internally-fired rotating dryer, pug-mill mixer, bituminous heating kettle, volumetric measurement, air controls. Mounted on pneumatic tires, or furnished for stationary operation. Capacities 4, 8, 12, 25 tons per hour.

Write for Catalog

Elkhart

White Mfg. Co. Indiana

clamps on walers, form width spacing, securing corners for aligners, clamp assembly, cleaning and oiling, etc. A rod layout sheet is attached for convenience in figuring inner rods.

127

THE MODEL 80 TRENCHMOBILE—Parsons Co., Newton, Iowa, has published an attractive 8-page catalog describing in detail the latest addition to the Parsons line of Trenchliners—the utility-size, rubber tire mounted Model 80 Trenchmobile. The new catalog carries many action photographs to illustrate principal Trenchmobile heavy-duty construction and its many applications in installing conduit, off-street connections, gas lines and water services, airport, railroad and golf course main-

tenance work. One-man operated, the Trenchmobile is described as designed for fast and profitable handling of small digging assignments formerly done by slow and costly hand methods. Schematic diagrams and engineering specifications are listed in addition for a concise summary of the new unit's design and performance.

128

PORTABLE CRUSHING AND SCREENING PLANTS—An engineering brochure containing many drawings with suggestions for arranging equipment to make up complete portable and semi-portable crushing and screening plants has been published by the **Crusher Division, Nordberg Manufacturing Co., Milwaukee, Wis.** This brochure, "Symons Cone

Crushers and Symons Vibrating Screens in Portable and Semi-Portable Plants," contains flow-sheets and tables showing arrangements, horsepower requirements and conveyor, screen and crusher specifications for various hourly production capacities.

129

CALIFORNIA CIVIL ENGINEER REGISTRATION EXAMINATIONS—August E. Waegemann of August E. Waegemann and Associates, civil engineers of San Francisco, announces a new edition (replacing that edited in August, 1947) containing all of the questions and solutions given in examinations by the California State Board of Registration for Civil Engineers from 1940 to July 1949, inclusive. The new edition, consisting of 162 pages, lithographed, 8½ x 11 in., also includes the new Engineer-in-training examinations and solutions, together with the California Civil Engineers Act and the Professional and Vocational Regulations. Price of the new edition is \$5.00 plus tax.

130

THE MASTERPLATE IRON-CLAD FLOOR—The Master Builders Co., Cleveland, Ohio, has published a 36-page illustrated booklet on the new-type concrete floor, giving full information on the product and methods which produce the nine features most important in industrial, commercial and institutional floors. Field experience and laboratory tests presented in this booklet show that the Masterplate Floor, with its iron armored surface about ⅝-in. thick, wears at least 5 to 6 times longer than a plain concrete floor. Other advantages of the floor discussed are that it can be produced with a non-slip finish, and

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UNUSUAL mixing principle means better coating of aggregate—less waste—faster output. Owners have reported savings as high as 50% per ton of asphalt.

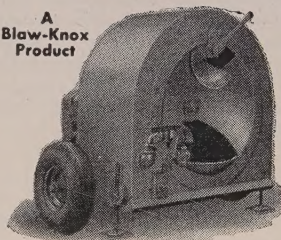
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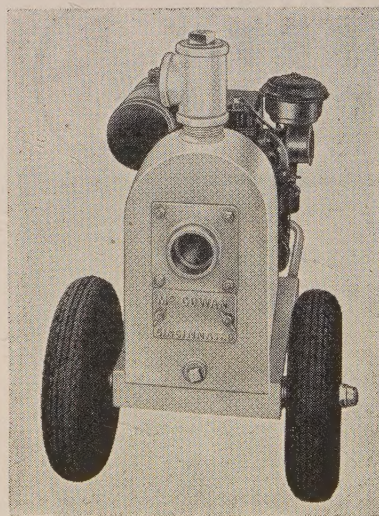
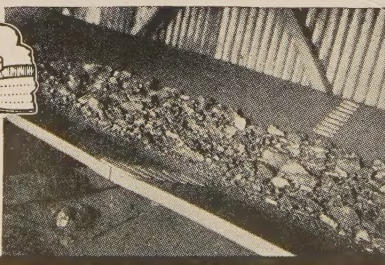
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in any one of eleven attractive colors. Job pictures show a few of hundreds of Master-plate floors in service. Detailed illustrated directions for laying the floor are given, both for new construction and resurfacing old floors.

131

POWER HYDRAULIC CONTROLS—**Monarch Road Machinery Co.**, Grand Rapids, Mich., has published folders describing the Monarch Dyna-Might Electric Hydraulic Power Controls. The various models of controls described are basically the same as to volume and pressure but vary as to method of drive, mounting and control. Each is designed to suit the needs of the user. According to the folders, provision is made for quick, easy installation on practically any make of truck. Monarch Hydraulic Controls are described as being able to handle any snow plow designed for hand pump lift.

132

HEAVY DUTY CRANE BLOCK—**American Hoist and Derrick Co.**, St. Paul, Minn., has published a bulletin describing features of the firm's Lo-Head Crane Block. It is described as being a compact, heavy-duty crane block that was designed and built with an extremely short overall length for maximum headroom. Specifications for blocks of different capacities are given, and drawings and illustrations are used to point out the features.

133

POWER-WHEEL BUCKETS—**George Haiss Manufacturing Co., Inc.**, New York City, has published an 8-page bulletin on use of the Haiss Power Wheel Buckets for rehandling sand, loose gravel, etc. Advantages of the bucket are described as fast closing of the bucket jaws, sturdiness without extra weight, low headroom requirements, compact dimensions and low economy. A sequence of illustrations shows both construction and closing action of the buckets.

134

"CATERPILLAR" DIESEL MOTOR GRADERS—**Caterpillar Tractor Co.**, Peoria, Ill., has published a 31-page booklet providing excellent illustrations and data on various applications of the company's three Diesel motor graders—the 100-h.p. No. 12, the 70-h.p. No. 112 and the 50-h.p. No. 212. Also included are engine cutaway pictures and close-up views of different parts and attachments on these units. The pamphlet stresses the rear-mounted engine, rigid rear axle, power controls, Diesel power and low pressure tires, as well as features of advanced design, construction and improved materials necessary for good motor grading.

135

SAFETY AND ECONOMY IN SLING-LIFTING OPERATIONS—**John A. Roebling's Sons Co.**, Trenton, N. J., has published a 4-page bulletin describing the new Tapered Sleeve Splice developed by the firm and telling how it eliminates the bothersome necessity of sling users splicing their own sling loops. The bulletin tells how the rolled loop and single tapered sleeve provide greater flexibility and compactness by developing full catalog strength of the rugged Preformed "Blue Center" Steel Wire Rope Sling.

136

ALL-METAL CLUTCH PLATES—Four new catalogs, covering the complete Velvetouch line of all-metal clutch plates, facings and brake linings for Caterpillar, Allis-Chalmers, LeTourneau and International tractors and earthmoving equipment, have been released by the S. K. Wellman

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Co., Cleveland, Ohio. Each catalog covers all of the standard and replacement parts for an individual line of equipment, and is clearly indexed for easy reference. Listings include tractor model numbers, clutch and brake data, dimensions, drilling information, Velvetouch part numbers, and quantities required for replacement. Requests for these catalogs should include a statement of tractor and earthmoving equipment being used.

137

PERMITE MEMBRANE CONCRETE CURING COMPOUNDS—An illustrated bulletin, published by **Aluminum Industries, Cincinnati, Ohio**, announces the development of two compounds—Permite V-167, recommended for all horizontal surfaces and for vertical surfaces below ground, and Permite V-169, recommended for all vertical concrete surfaces where non-discoloration is an important factor. The compounds are applied to the concrete surface by spraying, and form an impervious film which seals in the mixing water for proper curing. Description of technical features, methods of application and a testing laboratory report, showing results achieved by both compounds in meeting specifications established by U. S. Army Corps of Engineers, are included in the data.

138

ELECTRIC-EYE FLAME CUTTING—A new bulletin published by **Joseph T. Ryerson & Son, Inc.**, steel distributors, illustrates intricate and unusual steel shapes supplied by this firm, cut to customer's order with their new Electric-Eye flame cutting equipment. Typical of some of the irregular shapes furnished are Diesel locomotive parts, sprockets, grinding wheels, machine and equipment frames, etc. Shapes cut with the Electric-Eye machine are said to have sharper, squarer corners and greater accuracy than can be cut with other mechanized flame cutters.

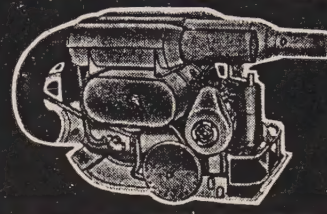
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Alloys as they are supposed to be

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